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Original Contributions.

PLEA FOR A UNIFORM METHOD OF TREATING ALVEOLAR ABSCESS.

BY G. LENOX CURTIS, M.D., NEW YORK.

The author calls attention to the fact that notwithstanding the commendable spirit of progress which has prevailed and still continues in the practice of dentistry, so little improvement has been made in the treatment of alveolar abscess that as given by the majority of practitioners, failure to effect a cure is still a far too frequent occurrence. Neither is there anything like uniformity in the procedures employed. Nearly every dentist seems to have a method of his own.

Both the large percentage of failures and the great diversity of methods of treatment are matters of sufficient importance to demand immediate attention and correction.

The cause of these unsatisfactory conditions is largely, if not altogether, attributable to the manner in which operative dentistry is taught in our regularly organized and chartered colleges. Each professor, instead of teaching the method laid down in the text books which the students are obliged to buy and study, teaches the method he, himself, prefers and practices. What wonder that under such tutelage the ideas of the student become confused, and that after graduation he begins to experiment, with more or less success, with the different methods that have been brought to his attention. There is no alternative left for him.

Although fully aware of the many difficulties that always attend the effort to establish a new method of procedure, however deserving, I believe the following plan for introducing and establishing a satisfactory and uniform method of treating the disease

in question will prove successful. Let the National Dental Association offer a prize for papers setting forth the best method of treating alveolar abscess in all of its stages; the merits of these papers to be decided by three judges, selected, one each, from New York, Chicago and Philadelphia, the three principal centers of dental education.

The selection of these judges would be a very important matter. It should be free from politics. The men selected should be well-known, unprejudiced and skillful practitioners; but should not be connected with any dental college.

The Association of Dental College Faculties should agree to recommend the method selected and see to it that all colleges teach it for at least a term of three years, or until a better method has been developed and adopted under similar conditions.

It should be incumbent upon the National Dental Association to give the method receiving the prize as much publicity as possible. It should be illustrated and published in all dental and medical periodicals, and copies should be mailed to all dentists. Practitioners thoroughly instructed in the method should be sent by the Association of Dental College Faculties from college to college to impart the chosen method in all of its details to the professors of operative dentistry. It should be the duty of the practitioner so sent to be present when the professor of operative dentistry teaches the method, so he may be sure that the students are correctly taught and are able to diagnose the disease and treat it in every respect as the method provides.

Following the plan for inaugurating this much-needed reform I give in outline my own method of treating some of the most important forms and complications of alveolar abscess.

Cause—The cause of this disease is not the tooth, but the decomposed pulp within it.

There is no more necessity for extracting a tooth to correct a disease at its root—unless the whole of the surrounding process is badly diseased—than there is for tearing down a house to correct a defect in the sewer pipe. When the pulp of a tooth has become putrescent there is sure to be an abscess at its roots, no matter what may be the condition of the gum.

Dr. Farrar's description of the manner in which an abscess

is formed, is quoted in preference to any other: "The gases arising from the putrescent pulp are forced through the apical foramen, where the pressure distends the peridental membrane, which thus becomes the walls of the abscess."

The distension may be so gradual that but little local disturbance is produced; the gum may be but little congested, if at all; necrosis may or may not be present, but there is always an absorption of the alveolar process—so extensive sometimes as to lead one to believe that an extensive necrosis has occurred.

The differential diagnosis is that, in case of abscess, the bone is smooth and dense, while in necrosis, the sac having been destroyed, the bone is rough and filled with pus.

There is no uniformity in the behavior in the course and termination of large cavities caused by absorption. Their contents may be discharged through the gum, through the nares, into the antrum, or they may be retained within the sac for an indefinite period.

Sometimes the septic irritation is sufficient to create a cystic tumor large enough to destroy all of the bone of an upper jaw. The author has seen cases in which both the malar and maxillary bones have been destroyed.

It is not always easy to determine whether you have an abscess or a cystic tumor to deal with. Farrar says: "In many cases of abscess there is only a tumor, the interior of which breaks down and discharges through the root; if the canal is clogged it is generally followed by a fistula." When this occurs a correct diagnosis of the abscess is not difficult to make, as the fistula leads directly into the sac.

The diagnosis of a "blind" abscess is often a difficult matter. Many older dentists and their teachers advise against disturbing them lest an acute inflammation be set up, which will necessitate a long and painful course of treatment. This advice is wrong. The dreaded inflammation, when it occurs, is always due to faulty methods of treatment. This usually consists of enlarging the apical foramen and through the orifice so made, forcing medicine into the sac, which has no outlet except the narrow canal in the root, through which the medicine was introduced. It is little wonder that an abscess treated in this stupid manner

should result in a condition requiring a long and painful course of treatment, with failure as its final result, for, notwithstanding the applications, there will always remain at the apex of the root, a diseased mass, which on the slightest provocation is ready to induce a fresh inflammation, resulting in necrosis or the nucleus of a cystic tumor.

The nature of an abscess is determined largely by the rapidity with which it develops, and while this treatment in all cases is universally the same, it must be varied to meet different complications. For instance, the pulp in a deciduous tooth might pain to-day and be dead to-morrow. The pulp cavity should be cleansed in the same way as would be done were the tooth that of an adult, but the cavity and canals should be filled with Canada balsam or paraffin and the tissue around the apex should not be disturbed. As to treatment, but little more is ever required than lancing the gum to allow the pus to escape, cold applications to the face and a saline cathartic. In the adult alveolar abscess may assume a variety of forms, but the cause is generally the same.

Diagnosis by Use of the X-Ray—By the use of the X-Ray the extent and general condition of many diseases of the mouth and teeth may be ascertained with certainty. By placing a very fine wire in the canal of the roots before the radiograph is made, the wire will show exactly the distance each canal has been opened and how much of it has not been opened.

Treatment—As the successful treatment of any disease includes the removal of the causes that have induced and perpetuate it, failure to discover the cause of an alveolar abscess is often the principal reason that the treatment employed is not successful.

Very often the overlooked cause is either the presence of a septic canal or an undiscovered abscess in an adjoining tooth, which is discharging into the fistula of the tooth under treatment.

More frequently, however, treatment fails of success because the practitioner does not know how to open the canals properly.

It is the firm conviction of the writer who, from the fact that he is constantly operating upon the mouth and teeth of patients referred to him by dentists and physicians, both in and out of the city, has unusual opportunity for becoming acquainted with

the methods different dentists employ, that not more than *five per cent* of practicing dentists are capable of opening the simplest canals correctly. In support of this contention he mentions some of his experiences, which go far toward substantiating this bold statement.

The attempt is generally made to open the canals at an angle. By this method the apex cannot be reached with anything but a bristle probe, with which instrument it is impossible to empty and cleanse the canal thoroughly. Sometimes when this method is used, canals not easily located are never entered, the dentist contenting himself with the idea that the tooth is deficient in the usual number of roots.

The successful treatment of alveolar abscess requires greater judgment and skill than any other dental condition. But unless successful the health of the patient is jeopardized and the foundation for fillings and crown and bridgework is "rotten" in every sense of the word. What is gained by making a magnificent filling upon a crumbling foundation or a beautiful crown over a slumbering volcano?

The writer does not claim that his method is entirely original, as Dr. Farrar suggested root amputation some years ago, and Dr. Atkinson has been given the credit of curetting the sac, while Dr. John B. Rich claims to have originated both of these methods before either of these gentlemen began to practice. For the method advocated herein and now practiced, is claimed simplicity and success, for at least 95 per cent of all cases treated are permanently cured.

Neither the time required to carry out the treatment nor the pain caused by it must be taken into consideration. A large amount of time is often required to open the canals properly, and for this time the dentist should receive due compensation.

The first and most important step in the treatment is to remove enough of the masticating surface of the tooth to allow exposure of, and direct access to the canals in all of the roots. All of the large canaliculi must be destroyed and the septic matter they always contain, removed. The canals in the first bicuspids and buccal roots of molars are often tortuous and contracted, but they must be found, opened and filled. This work,

including alveolotomy and the subsequent treatment, should be completed within a few days or weeks.

Notwithstanding the claims of some dentists to the contrary, it is possible to fill the hair-like cavities to the very apex. In cases of teeth with distorted and malformed roots it will be found practically impossible to open the canals to the apex, and it is such cases as these that present the necessity for amputation.

When the apex cannot be reached fill the canal as far as opened and amputate at the point of filling, removing the portion cut off. If the apex is softened by decay it should be drilled away. Amputation is not always an easy task, but it can and must be accomplished.

A large percentage of dentists do not have the necessary instruments with which to open and cleanse the canals; hence the large number of extractions. Not more than 20 per cent of dentists make proper efforts to open the canals of molars and bicuspids, and of these only about 5 per cent are successful, while those who are competent to treat all cases do not comprise more than 1 per cent.

After the canals have been permanently filled, if a painless operation is essential, a saturated solution of cocain should be injected, first giving the patient 10 gtts. of Volasem, which is an antidote, and without which no more than a 2 per cent solution should be used. Even a solution of this strength should be guarded by a heart stimulant and a respiratory stimulant.

After a minute or two plunge a drill in direct line with the apex of the root. If there is more than an acute inflammation a cavity will be found in the process at the joint. The amount of operating to be done will depend upon the extent of the cavity and the condition of the root and surrounding tissues. If the inflammation is slight the mere giving vent to the congested blood is generally sufficient to effect a cure. The drill, however, should be run over the apex of the root to break up the peridental membrane and allow the escape of any pus it may contain. The size of the opening through the gum depends upon the amount of disease present and whether or not a gauze dressing is necessary.

The cavity in the process or maxillary bone should be roughened with a bur or curette and the sac removed. Caries may affect the apex of the root only, or it may extend throughout its entire length. If you believe it possible to save all or part of the root, it should be cleansed of the caries and the wound should be dressed as often as necessary until it is completely filled with granulations.

Always continue the amputation until the filling material in the root is reached, so as to be sure that no unfilled portion of the canal remains.

If the opening in the gum and process is large enough to allow the effervescing peroxid of hydrogen to escape readily, use it to boil out the debris and to check the hemorrhage. Otherwise I syringe wound with a solution of Electrozone, ¼ per cent, or with a 10 per cent saline solution. Peroxid should not be used after the operation because it retards the granulations, if it does not destroy them altogether. The other solutions named are safer, but even they should be used as infrequently and with as little force as possible to avoid the danger of breaking the blood vessls which deposit the lime cells.

Should pus be found in the wound, you may be sure that all septic matter has not been removed or that infection has occurred from septic instruments or dressing. If from the latter cause, injections of electrozone followed by tincture of iodin will usually render the wound sterile. If the pus is caused by diseased bone, a second operation may be necessary.

When the wound is large enough to allow saliva or food to enter it, pack with gauze, both to prevent secondary hemorrhage and to stimulate granulation. The packing should be continued until the cavity is filled in and the wound healed. Care must be taken not to allow the gum to heal over until the cavity is filled with healthy granulations, lest the serum or excrement from the wound decompose and cause reinfection.

In treating the grinding teeth it sometimes happens that the bur penetrates the antrum. When this occurs the antrum should be douched with an electrozone or salt solution to prevent the formation of a clot within it, which might result in sepsis. Afterward pack the wound to the point of puncture in the antrum.

Care should be taken thereafter not to force solution into the antrum.

One or two days' time is all that is necessarily consumed in treating minor cases, but as many weeks may be required for the ordinary ones. When much bone has to be reproduced, six or eight weeks may be required and the wound may have to be dressed two or three times a week.

I frequently operate upon a case and then send it back to the dentist from whom it came for subsequent treatment. I find that sometimes the dentist mistakes the natural secretion of the wound for pus and pursues a line of treatment which is not only unnecessary but which actually retards recovery. The microscope will quickly dispel any doubt about the nature of the discharge. The excrement from the wound should be completely removed, as it is essential for rapid granulation.

Occasionally it will be found that, closely associated with an abscess is a cystoma. When this is the case no different treatment from that for the abscess is necessary.

I close with an appeal to the younger and more ambitious members of the profession to familiarize themselves with the method advocated and practice it until they are able to locate the apex of the root and detect the condition of the cavities in the jaw by the touch of the instrument alone. Practice makes perfect, but few dentists get enough of it to be worthy of this degree of qualification.

CAN DENTISTRY BE MADE OVER?

BY FRANK W. SAGE, D.D.S., CINCINNATI, OHIO. A REPLY TO DR. SMITH'S PAPER "THE NECESSITY FOR REFORM IN DENTAL EDUCATION."

A paper read by Dr. D. D. Smith, of Philadelphia, before the Michigan State Dental Association, last July, entitled, "The Necessity for Reform in Dental Education," is in its entirety so open a disparagement of the dental profession, and is, moreover, so devoted to fanciful suggestions for the betterment of the profession, that I am impelled to attempt a reply. I assume the

privilege he assumes of plunging at once *in medias res.* omitting what he calls "adulatory exordium," as well as apologies of any kind.

Dr. Smith begins with a statement that his effort has been "to focus attention more sharply upon some objects hitherto disregarded, perhaps unnoticed, in the field of dentistry." He adds, "I believe the dental profession will one day stand . . . as the coadjutor of medicine, a real adjunct to the mother science, and something more helpful to humanity than any present recognized branch of medicine." This last idea he repeatedly affirms, as: "it (dentistry) will be esteemed, we believe, the most important branch of the healing art," etc. This rather remarkable statement is so often reiterated, that one is quite consumed with curiosity to learn exactly what he means. That, in the end, is left to inference. For the present I leave it, preferring to direct attention to other preliminary matter set forth in his paper.

Dr. Smith, first of all, arraigns the profession for not—in short, for not being something of more consequence than it really is. The burden of his plaint is, that "dentistry stands to-day for scarcely more—surely for nothing higher—than the redemption of decayed teeth."

He next defines dentistry, referring to various dictionaries, assuming this to be a matter of considerable importance. Most of us know well enough for practical purposes, however, what dentistry is, and since definitions are but the final affixing of the stamp of culture to usage, we may leave that for the present. Particularly since Dr. Smith indicates his opinion that dentistry at all events, needs redefining.

This paper offers various original conceits, as in declaring, "the necessity for the existence of the dental profession is paramount," yet later going on to show the comparative unimportance of the teeth. He says: "Full preparation of digestible, assimilable foods is obtained without aid from the teeth. When dentistry shall apprehend fully the facts, the emphasis will not be upon the necessity for teeth in mastication, but upon the pleasure they afford as an adjunct to mouth mastication. . . . The com-

fortable, unconscious use of the teeth in mastication affords a stimulus to gustatory pleasure, and contributes a nervous aid to digestion which, in importance to the system, far exceeds any demand for the exercise of the merely mechanical function of mastication." He further proceeds to show that the preparation of food by means of the teeth is not indispensable, as attested by "thousands upon thousands of fully edentulous mouths."

Exactly what distinction Dr. Smith means to establish between ordinary mastication and "mouth mastication," whatever that means, is not clear. In the end, however, he reiterates that emphasis is to be placed on the fact that mastication is not as ordinarily taught, the important function of the teeth. With all proper apologies to Dr. Smith this assumption is as novel as if one were to claim that the important function of a man's legs is not so much to carry him about, as to contribute to his pleasure as a means for displaying the latest pattern in trousers. Dr. Smith seems unwittingly to have proved too much, as the logicians say, in thus averring the comparative unimportance of that upon which a function is to be exercised, while claiming supreme importance for the agent performing that function.

A full reading of this somewhat lengthy paper forces one to the conclusion that Dr. Smith would like to argue present conditions in dentistry, if not dentistry itself, out of existence. He says, referring to Webster's and the Century Dictionary's definitions of dentistry, "these settings for the dentist and for dentistry are not calculated to engender pride in our profession, or to make the dentist overly puffed up with the dignity of his calling." This is followed by another repetition of the remarkable idea already set forth, that "when dentistry shall come into its own, it will be esteemed, we believe, as the most important branch of the healing art."

This, it is not perhaps premature to announce, appears from later statements to indicate his belief that it is possible to make dentistry over into something far more worthy. I find, on examining his text at this point, that we are already approaching his shadowed definition of this prophecy. He says, "The filling of cavities of teeth, whether with metals, cement or porcelain, must be subordinated to the study of conditions governing the *preser-*

vation of the teeth." Further on he says, "Change of environment, frequent, forcible, thorough, is the watchword for relief which should be rung through all the confines of dentistry."

Here then we find the first intimation of what Dr. Smith would have dentistry become; an agency of prophylaxis, effectual prevention, instead of devoting itself exclusively to restoration and cure. The desirability of this, no one can deny. It seems that Dr. C. N. Johnson of Chicago anticipated Dr. Smith in this, in a paper read before a Tri-State Dental Convention assembled in Indianapolis, Ind., in June, 1901. The subject was discussed at length by various eminent members of the profession. Dr. Johnson did not, however, to my present knowledge, find occasion to complain of existing conditions in dental practice, his suggestions being rather tentative.

Dr. Smith, however, insists there must be instant measures taken to assure a higher standard of scholarship in dental colleges, a broadening of the curricula, an immediate girding on of the armor preparatory to carrying by assault, this problem of *prevention.* One might suppose after this sounding of an alarm, Dr. Smith would have certain definite suggestions to make, indicating at least the lines along which research should be made to achieve the tremendous triumph he foresees. But why this relegating to a lower plane of the present resources of dentistry for repair and restoration? Why not, after the same manner, urge on the medical profession that they subordinate the use of medicines, of surgical instruments, *et id genus omme,* to the "study of conditions governing the *preservation*" of brain, stomach, lungs, kidneys,—all organs of the human system whatsoever, at present requiring medical interference for restoration of impaired function?

Now, at last, Dr. Smith's idea is beginning to be disclosed; he says, "the complex conditions and relations of the oral cavity must be studied and treated as the rightful heritage of dentistry. The prevention of decay must be forced upon a level higher than the mechanics of 'extension for prevention.'"

Here, at last, we have a hint of his meaning in saying that "dentistry is destined to become something more helpful to humanity than any, at present, recognized branch of medicine." Obviously Dr. Smith anticipates a time when dentistry, by virtue of

restricting its researches to the oral cavity, will not only triumph over causes of decay in teeth, but incidentally, over every disease whatsoever, having origin in infection through the mouth. This would surely include consumption, Bright's disease, cholera, and a host of other diseases. The doctor has, indeed, exalted hopes for the dental profession.

But why this assumption that the conditions and relations of the oral cavity are "the rightful heritage of dentistry?" I am aware that, in the past years, dentists have assumed that the mouth is their pre-empted field. Is the claim justified in reason? One might suppose, from Dr. Smith's intimations, that oral prophylaxis is something that has been totally neglected all these centuries by the medical faculty, the tacit understanding being that the field properly belongs to the dentist, on which account it has been preserved inviolable, as virgin soil, awaiting the pleasure of the dental profession to enter and fully occupy. That medical scientists, in extending their researches, have on that account refrained from pushing their inquiries into the etiology of disease, into the oral cavity.

But, not to appear captious, let us assume that the great desideratum has actually been attained; that some dentist or dentists have discovered means, simple of application, for absolutely preventing decay, pyorrhea, and other mouth affections. What then? There would instantly be an end of dental colleges, with all their present imperfect conditions, with any conditions whatsoever. There would be an end of dental literature, of dentists, of dentistry. Dr. Smith himself would be swallowed up along with the others of us, inferior lights, in the Nirvana of medical retrospect. A monument erected to the memory of the lated lamented dental profession would crumble like the reputation of a certain famed New York senator, who might be named, in no time at all. The medical profession would disappear from off the face of the earth, leaving the field open for a new order of nondescript professional men, possibly embracing physicians and dentists, the last being first, by virtue of priority of discovery. This is too much to expect.

There is no more reason for assuming that the mouth is the "rightful heritage of dentistry," because of the accident of juxtaposition which has placed the dentist nearer to it than to his pa-

tient's feet, than there would be in assuming that the native inhabitants of the Panama isthmus are best fitted to execute the great Trans-Isthmian canal enterprise, because of their having so long lived in the vicinity. Does Dr. Smith for a moment suppose that dentistry would be given the credit in case such stupendous results should follow the profession's thus camping beside the oral orifice, prepared to waylay the enemy finding entrance there despite the watchfulness of medical scientists?

The matter naturally resolves itself back to the proposition that medicine is medicine, and dentistry is dentistry. If Dr. Smith could find a way to positively prevent decay of teeth, it might be different. What he foreshows must be far more important in its benefit to mankind than this, to justify his belief that "dentistry will become more helpful to humanity than any recognized branch of medicine."

Dr. Smith metaphorically lifts his eyebrows, in referring to the alleged achievements and "wonderful advancement?" of the dental profession, within recent years. It would be interesting to know if he could or would designate an era in all the past to which he would refer inquirers as to the status of dentistry with more pride than the present. He tells of various professors and teachers in dentistry, calling the profession names, and appears to approve. He quotes someone as having called the D.D.S. degree a "badge of partial culture." This is an old aspersion on the dental profession. It is unkind. It reflects unnecessarily on a body of professional men, who, whether they be or be not generally "ignoramuses,"—another quotation—have done an incalculable amount of good, far outweighing any extreme estimate of evil through lack of medical training.

This badge-of-partial-culture bugaboo is a mere epigrammatic conceit; a sententious nothing, invented for the purpose of branding the dentist less favored than his brother, with the M.D. degree; to humble him, and teach him his place. Gradations of culture exist without regard to degrees.

Dr. Smith finds much to regret in the fact that dentistry is not more closely allied with medicine. I have always maintained that a dentist may, with consistency, practice dentistry without the title M.D. affixed to the D.D.S. He may assume to reject all minor

surgical operations, referring the patient to a physician or surgeon, if he prefer, and yet incur no reasonable charge of incompetency. The argument, pushed to its ultimate conclution, against a dentist's invading, even in the smallest degree, the field of medical practice, is irrefutable, if he choose to employ it. It is in effect this: If the dentist assumes surgical functions he must be prepared, in accordance with all rules of consistency, to follow the patient through all conceivable complications; to his bedside, whithersoever his further services may be required, until full restoration to health be assured. It is conceivable that a dentist, having on hand a few cases of unexpected relapse, after operations, might be unable for days to attend to the ordinary operations appertaining to dental practice. If he retire from the case, calling in a physician, in what respect is his course different from what it would have been had he referred the case to a physician in the first instance?

It has been urged that in country districts, especially where oftttimes physicians are not competent, the dentist should be equipped with medical qualifications by way of supplement. This argument is not competent. It *is* competent to throw responsibility for the physician's shortcomings, back upon himself. With all due regard for Dr. Smith's opinions and feelings, I have always felt that my own duty ended with my qualifying myself as nearly as might be to recognize conditions requiring a physician's assistance. If, by virtue of being in close proximity with some of the finest physicians and surgeons in America, I have enjoyed opportunity for private instruction in minor surgery such as the dental college should have supplied and did not, I count that as an advantage, at least.

In all this discussion of the question of medical education for dentists, allowance being made for the chagrin felt by a certain percentage of the profession, on account of their not ranging in popular opinion with physicians, regard should be had for the fact that men naturally gravitate to law, to medicine, to dentistry, from impulses born of what these several professions offer. Dentistry, as I have often said in dental societies, and in print, is *sui generis.* If it happens to trench somewhat on the field of medicine, that is an accident, nothing more. There has been and is still, no end of empty vaporing about raising the standard of dental education, a strain-

ing to make dentists conform to the double standard of dentistry and medicine. The real question is not what would we have, but what *can* we have. It is to be deplored that dentists know so little about diagnosis, medicaments, and all that. But in deploring that we must not lose sight of the fact that the very features that these would-be reformers decry, are the features which make dentistry worth while, in the esteem of the public—to-wit, mechanical offices, particularly. The public does not want to see dentistry absorbed in medicine. The patrons of the profession want fillings, plates, bridges, inlays, orthodontia. Not even the leaders of the profession are, or can ever become, the arbiters of its destiny. If this matter were referred to the popular verdict, it would be found to be, "Give us dentists, *good* dentists, plenty of them. If it is likely to impair their mechanical dexterity to teach dental students medicine, don't do it! We can find our own physicians."

You cannot make dentistry over. You may and should improve it. You may raise to the loftiest heights of medical attainments and dental attainments, a few, a certain per cent of those applying for dental diplomas. But you cannot expect the average dental student, coming to the college to learn *dentistry,* as ordinarily understood, to conform to the double standard.

From careful consideration of all that has been said on the subject in dental journals, in societies, in conversation with physicians, I make bold to challenge the statement, or opinion, that dentists, merely because they are dentists and not doctors, are regarded with disfavor by physicians. Dr. Smith declares that during his one year's attendance at a medical college he "heard not one respectful allusion to dentistry, either as a special profession, or as a co-ordinate branch of medicine." If this argues anything, it is that dentistry cannot possibly be made acceptable to medical men.

My own experience as a lecturer for years, in a medical college, enables me to say, at least, that while I do not recall any positive compliment paid to dentistry, by either professor or student, I was never given occasion to suspect dentistry was lightly esteemed as a profession. Otherwise I feel I should never have been invited to lecture. I am able to say I was always received with unfailing expressions of cordiality and esteem by professors and students; my lectures were attended by the entire body of students,

and I was asked to hold examinations, as did all the other professors, of students applying for graduation. We have many of us heard the dental profession referred to by physicians, as the "sister profession."

I have no objection to frankly stating, if it will at all please Dr. Smith, that, in my opinion, a dentist who has traversed even after a somewhat superficial way the entire field of medicine, has an advantage over another who has not. The real point at issue between himself and me is this: that he affronts the rank and file of the profession as it now exists while offering no practical suggestions for bettering things, but merely vague generalities pointing rather to the doing away entirely with dentistry.

If, as Dr. Smith quotes a certain professor as saying, "dentists are a lot of ignoramuses," that in itself may be sufficient reason for their lack of influence with physicians, or in their community. The fact remains, however, that in all the essentials of dental practice proper, even the most ignorant are often highly successful dentists. Yet they may have no social standing whatever. Again, the poorest dentist in a community may have the best social standing.

In papers read before dental bodies I have more than once in years past, emphasized the fact that the standard by which dentists or a dentist is measured, is usually an individual standard. I am able to call by name two or three dentists in the same building with myself, a building devoted to physicians and dentists who, while openly disavowing any considerable knowledge of medicine, are received on terms of equality unmistakable, by physicians in adjoining apartments, some of them men of national reputation. My own next-door neighbor, a specialist known all over the West, trained at Heidelberg, was for years my *confrere* in editing a medical and dental journal. I have never discovered in his treatment of myself any assumption of superiority.

Dr. Smith says, "there is not a question of diagnosis, treatment, or general management, even in purely dental cases, where, if difference of opinion should arise, the dictum of the medical man would not be regarded as authoritative over that of the dentist." That may be true. Equally true is it, no doubt, that the dictum of the medical man would be regarded as authoritative, if

it came to a difference between himself, an M.D., and a dentist, both an M.D. and a D.D.S. It may be regarded as of interest, in passing, to state that in our medical colleges, dentists applying for courses of lectures are not infrequently regarded with more or less suspicion, as caring more for the mere degree than for proficiency in their studies. How could it be otherwise, when dentists often practice half a day, giving the other half to medical studies, while in the medical college, the strictly medical students give all their time! This is submitted as merely a hint to dentists contemplating taking a medical course.

There seems to be much morbid repining in certain quarters, in all this sort of talk. Physicians no more despise or dishonor dentists for not being physicians, than they do lawyers, or ministers, for the same reason. They are, indeed, foremost in recognizing the fact, if, as often happens, a dentist has enjoyed opportunities for education in other ways, broader than any medical college can be expected to give. Some of the most intelligent men in the dental profession are graduates of colleges; have classical culture, although not inclining toward the study of medicine. All of these things add to their influence as citizens, give dignity to their life, and afford them a footing in any social circle open to the physician.

Dr. Smith does not overlook the dental text-books. He seems not thoroughly pleased because no one of the various contributors to the American Text-Book of Operative Dentistry has given sufficient thought to the fact of dentistry's being a specialty of medicine, to omit clamps and scalers, and dams and separators from special mention, in order to emphasize the important relationship. He disapproves of a writer, a professor and a dean, he tells us, because he introduces the subject of preparing cavities for fillings with a statement that "suitable preparation of the cavity for the filling is a matter of importance hardly to be overestimated," obviously overlooking the fact that in all probability the fact that this writer was known to regard the preparation of cavities as being so supremely important, was doubtless the very reason why he was asked to contribute the article to the American Text-Book of Operative Dentistry! Dr. Smith asks, plaintively, "Is this the best that dentistry has to present to students of the science? If so,

let us no longer boast of it as a profession, much less as a part of the medical profession."

Exactly what Dr. Smith would have contributors to a work on Operative Dentistry do, if not write, about Operative Dentistry, I am unable to divine. Only on the assumption that he means to argue operative dentistry and all kinds of dentistry out of existence, am I able to account for his vagaries.

A Method of Resetting a Bridge Without Removing It from the Mouth Where One of the Anchorage Points Has Become Loosened.—Mrs. M. presented herself to me for treatment. On examination I found a bridge extending from the upper right canine to the left canine, and thence to the second molar. The canine roots were supplied with Richmond crowns and the molar with a gold crown. The left canine had loosened and the weight and leverage were so great that the molar had also become loosened and would drop out of the socket as far as the bridge would allow—that being about half the length of the root. There was a profuse discharge of pus from the molar socket. The molar crown was tight to the tooth, and it would have been an impossibility to have split the crown and removed it without risk of the tooth dropping out of the alveolus.

The right canine being tight, I decided to drill through the gold on the lingual surface of the left canine crown. After drilling through the solder and cap of the Richmond, I extracted the loose post and fitted a Justi post through the gold into the canal. After sterilizing the root and cap, I cemented the post in position, holding the bridge until the cement had hardened. I then drilled a pocket around the end of the post, saturated the same with phosphoric acid, and filled the pocket with a quick-setting amalgam. I then began the treatment of the molar socket, using the compressed-air atomizer with a Parke-Davis hypodermic needle as a nozzle, and washed the socket once a day with dioxogen, glyco-thymolin, and campho-phénique. The composition of the formula is as follows:

Campho-phénique	℥j;
Dioxogen	℥j;
Glyco-thymolin	℥iij;
Water	q.s. ad ℥vj.

After twelve treatments the abutments of the bridge were firm and in correct position.

With the small nozzle on the atomizer it is not difficult to reach the apex of the socket, and to wash out all pus and foreign matter, thereby stimulating a healthy granulation. The detachable point of a Parke-Davis hypodermic needle passed through a small piece of unvulcanized rubber and placed in the tip of an atomizer is useful in treating pockets around the teeth, as well as fistulous tracts.—P. Neff Myers, *Dental Cosmos.*

Digests.

SOME REASONS FOR INSTITUTING A PUBLIC MEANS OF PROTECTING THE PROFESSION AGAINST THE USE OF POOR ALLOYS. By Marcus L. Ward, D.D.S.C., Detroit, Mich. Everyone who has acquainted himself with the history of dental amalgam alloys knows at the beginning, that a work of this kind, which is intended to divulge some of the so-called trade secrets which have so long barred its progress, will encounter numerous difficulties, and is not deserving of censure where kindly criticism would serve to better educate the profession.

With the advent of a public means for testing alloys, as recently suggested by Dr. Black, there is marked the final decay of some of the wilful misrepresentations on the part of some of the manufacturers, baseless accusations of dishonesty on the part of others, and censure to writers on this and other similar phases of this subject.

There is little doubt but that this is one of the conditions that has retarded our progress for years, and if continued after a public means has been provided for testing, will prove a boomerang that will rebound only to smite the throwers.

We can conceive of an article of this kind working a hardship on the makers of inferior products by giving information to the unskilled, whereby they may begin the manufacture of a product for competition.

It is from this element only that I expect criticism for telling what I know, since the better manufacturers are being isolated by such work, and are receiving their reward for conscientious efforts.

If we were to ask the profession today why a gold filling was better than an amalgam filling, what per cent would reply with intelligent answers? It would be surprisingly small indeed, but the blame cannot *all* be placed upon the manufacturers who have thus wrangled and quarreled.

While we have all seen and read many of the ridiculous claims made by the makers of some of our alloys, and listened to the pleadings of their agents who are so solicitous of our welfare, we

cannot place our *own* ignorance and disappointment at results obtained by using their products at ***their*** feet.

We must trace this condition of affairs to our own doors, because no one in the profession has brought the subject to a scientific basis which compares favorably with those in the associated sciences. Neither have the teachers in our dental colleges been able to present the subject like teachers in engineering are teaching the alloys of steel, brass, etc.

We should for the present, at least, have some means of knowing whether an alloy is reliable or not, without having to wait the test of time in the mouths of our patients. We should at least know the composition of our alloys, the reasons for inserting some metals and excluding others, and the manipulation necessary to bring out the best qualities.

The physician cannot combat disease by giving some grippe tablets for grippe, rheumatism tablets for rheumatism, and so on through the list of ailments. He must, first of all, know the composition of the tablets and the action of each ingredient. Second, he must have confidence in the maker of the tablet to place in them what he has labeled on the bottle.

While many of the greatest of the world's physicians are still inscribing their loftiest thoughts in the form of prescriptions, they, too, are using ready-made prescriptions in the form of tablets, capsules, etc., but in every case the composition is known and the maker must be one of repute. Do we combat disease with alloys of known composition? No. What would it avail us anyhow, since only about one in every hundred knows the action of each ingredient, and understands that with dental amalgam alloys, other things than the right composition are required to make a good alloy. Do we always buy alloys from makers in whom we have the utmost confidence? A few do, while hundreds are buying and using almost anything that comes along, this being particularly true in the smaller places.

It is not uncommon to see men using alloys made by those whom they would not trust with any other operation. I know of some makers of alloys whose average intelligence is far below par, let alone any special training necessary to enable them to make a perfect material, and yet scores of dentists are using their alloys.

Can we imagine a physician prescribing drugs made by a man who does not know quinine from arsenious acid? No. But we can find a similar condition of affairs in our profession regarding the sale of alloys.

It is obvious that there is little analogy between the two so far as danger to human life is concerned, but the idea of professional men buying supplies for mercenary or other reasons from manufacturers who had better be pushing a wheelbarrow is the same. It is the excuse for their existence.

Scores of times have I been told by dentists throughout the country that they could see little difference between the alloys made by the "hinky" dealer and those made by one who had a reputation at stake.

While this is true with a great many, there are few who are closely observant and are able to distinguish between the two after some little time. The men who are unable to distinguish between the two classes of alloys, as a rule, do not use any one make long enough to become familiar with its working qualities, nor to see the results of their labor before trying some other make.

They are affording themselves every opportunity to change, and continually expecting to find that some fellow who could not make a living in practice, nor whom they would trust with anything else' to have discovered an alloy from which all the hitherto objectionable features had been eliminated and all the desirable ones added. How ridiculous for men to practice for years aimlessly buying and blindly inserting anything that comes along with little or no concern for the well-being of the teeth which have been intrusted to their care.

It is to be hoped that such men will, in the near future, be given a chance to conserve the energy which they have been expending in searching for better alloys, and apply it to the arts of observation, that the next few years will not be ones of turmoil and impeded progress to them, with no entries on the credit side of the book to represent benefits received.

We have some makers of alloys who, while they differ somewhat as to what constitutes a good alloy, are putting their best energies into experimenting and manufacturing good alloys, that they may maintain the reputation that they have made in this and other

lines, while on the other hand we have other classes who have begun manufacturing alloys with no training whatever, who have made little or no progress since beginning the work, who admit that they are "in it" for the money, and yet they are just the ones whose highest ambition is to discredit the profession, depreciate the motives, and disparage the achievements of one who attempts a work of this kind.

I have in mind a man who began by selling a few specialties made by others, but in a short time began making his own specialties, among which were dental alloys, because he was not satisfied with the profits of selling alloys made by experienced men. The ignorance that he displayed was horrifying, to say the least, and would require too much space to be given here, though he is selling pounds of alloy.

Conscientious Manufacturers Differ.—It is quite evident that many of our makers of alloys, whose past reputation and attitude toward the future are beyond question, differ as to what constitutes a good alloy.

There is made in this city an alloy which with many others I have watched closely and analyzed several times during the last three years. Its composition has approximated silver 68 per cent, tin 26.50 per cent, copper 4.20 per cent, and zinc 1.30 per cent every time I have analyzed it. There is another one made not far from this city which I have found to contain 65 per cent of silver, 27 per cent of tin, 4.50 per cent of copper, and 3.50 per cent of zinc.

Let us notice that these two alloys conform quite closely to the general rule—that our best hard alloys contain from 65 to 68 per cent of silver, 26 to 28 per cent of tin, 3 to 4½ per cent of copper, and 1 to 2½ per cent of zinc.

Let me repeat again that I firmly believe that each of the manufacturers of these two named alloys is honest in his conviction that he has a better product than his competitor.

After some observation I am led to believe that each one is justified in making such claims, though I wish to qualify the statement by saying that each one is measuring the quality of his alloy by a different standard.

The maker of the first alloy who places 68 per cent of silver in

it, and cuts it coarsely, gets a product whose crushing resistance, when first made, is approximately 500 pounds on a filling one-eighth inch in diameter and one-eighth inch high, while a filling of the same dimensions made from the second alloy will fall at least 100 pounds below the first.

Obviously, the maker of the first can claim superiority over the second in this one particular, viz., strength. On the other hand, the maker of the second who places 3.50 per cent of zinc in his alloy and cuts it finely obtains a product which works a little easier, sets a little slower, and retains a little better color in most mouths, due to the fact that the sulphide and oxide of zinc are both white.

Obviously, he claims superiority over the maker of the first in this respect. He is correct, since the strength of his alloy is sufficient to resist the ordinary forces of mastication, and the setting qualities are such as to afford a little more time to insert the filling, rightfully claiming that many a filling is a failure because the alloy sets too rapidly.

This comment applies to these two alloys as they are being made today, and is not intended to be a comparison of them when cast, cut and annealed, under different conditions.

Both of these alloys are free from shrinkage, hence no claims of superiority are made by the maker of *either* in this respect.

The maker of the first claims that zinc is the disturbing element in our alloys, and must be kept down to about 1 per cent or the filling will expand indefinitely, resulting in spheroided and otherwise distorted fillings with protruding borders. The maker of the second believes the same thing about the action of zinc, but let us notice how he prevents these indefinite expansions and continues to use 3.50 per cent of zinc.

This brings us to the question, why does zinc cause these indefinite expansions? From what evidence we now possess we must assume that dental amalgam alloys composed of silver, tin, copper, and zinc, in the proportions previously mentioned, are not definite chemical compounds with properties differing from the constituents of which they are composed.

We know that most metals are capable to some extent of existing in a state of chemical combination with each other, but, as a general rule, they are united by feeble affinities, for it is necessary

in order to produce energetic union that the constitutents should exhibit great dissimilarity in properties.

It is probable that these metals do unite in definite proportions, but, since they dissolve in all proportions in the melted metals, and we are able to identify the action of each constituent in the finished product, it is indeed difficult to say whether they are solidified solutions of one metal in another, mechanical mixtures, feeble chemical combinations, or a mixture of all three.

However, we have plenty of evidence to show that a portion, at least, of each constituent retains its properties through the melting and casting process and exerts either a beneficial or detrimental effect upon the finished product in the same manner as the constituent itself is beneficial or detrimental.

The amalgamation process as practiced by dentists is only a partial one. We can readily see that mercury will not completely dissolve alloys cut as coarsely as we are getting them at present unless the temperature is high or a much longer time is spent in working the alloy and mercury.

Most operators triturate the alloy and mercury until they are coherent enough to be turned into the hand. They then work it in the palm of the hand a little and pack it into the cavity. The result is that only the surfaces of each little particle of alloy are attacked by the mercury, leaving a large portion of each particle undissolved.

These undissolved particles, rather than any one constituent, are the real causes of the unstability of our amalgam fillings, because the mercury in loose combinations with the tin, and the excess which is mechanically held in the mass at the time of mixing, continues to break down the undissolved particles for months after the filling has been inserted, thus increasing many times the movement which accompanies the mixing of the alloy and mercury, whether it be shrinkage or expansion.

With this in mind are we to be chagrined at finding some of our fillings which gave slight expansions at the time of inserting to be spheroided or otherwise distorted in a few years? And can we not see that the metals which unite with mercury at ordinary temperature are the ones which facilitate the breaking down of any undissolved particles of alloy?

The metal which unites with mercury *most* readily at ordinary temperature is zinc, hence, the maker of the first named alloy who says that zinc is the disturbing element because it does not lose its identity in the melting and casting process, is partially right in the assertion, but the maker of the second who continues to use larger percentages of zinc and cuts his alloy much finer, overcomes much of this action of zinc by obtaining a more perfect amalgamation at the time of inserting the filling.

After keeping these two alloys under my observation for nearly two years I became convinced that there was little difference in the two so far as stability was concerned, though you will see that there is more than double the amount of zinc in one, than there is in the other.

Laboratory Tests at Different Temperatures.—Laboratory tests which are carried on at room temperature are not quite practical, because they do not indicate *how much* movement takes place. They do indicate, however, whether the movement is shrinkage or expansion, thus enabling the maker to protect us against a possible occurrence of the former.

A given bulk of an alloy which expands 1-10,000th of an inch at room temperature in a given time will almost invariably give a greater expansion in the same time if the test is kept at possible mouth temperature, viz., 120 degrees F. to 140 degrees F.

The analogy between this, and aiding other chemical actions with heat, thus becomes quite apparent. These two alloys were purchased in open market and six fillings made from each one. The proportions of mercury and alloy were carefully determined. These proportions were weighed out for each filling and triturated in a mortar 1¼ minutes, after which they were worked in the hand 3½ minutes. While this was a shorter time than it should be triturated, it is about the time consumed by most dentists for this operation.

The packing was done with flat ended instruments, using steady but heavy force immediately after the mixing. The mass did not lie still a moment. Readings were now taken on six of the tests (three of each alloy) with the fillings and micrometer at room temperature (70° F.).

The other six (three of each alloy) were read with the fillings

and micrometer in the thermostat at body temperature (98° F.) and left there for twenty-four hours, after which time the temperature was raised to possible mouth temperature (130° F.) and kept there for nearly two years.

Let us notice that three fillings of each alloy were thus kept at room temperature, and three of each kept at body temperature for twenty-four hours and then at possible mouth temperature (130° F.) for the remainder of the time.

The reason for subjecting the second set of fillings to 98° F. for twenty-four hours was that I wanted to take advantage of the doubt that existed in my mind as to the rapidity with which mercury will diffuse and uniformly distribute itself. This I did by keeping the tests at a low, rather than a high, temperature during the initial setting, the time when the mercury would diffuse most rapidly, because it is not mechanically prevented from diffusion by early crystallization of certain parts of the filling.

Every one of the twelve fillings gave expansion varying from 1-20000 to 3-20000 of an inch during the first twenty-four hours. The next thing that I observed was that the tests which were kept at room temperature gave no further expansion after the first ten days and practically none after the first three or four days, while the ones kept at possible mouth temperature (130° F.) expanded for nearly two years.

The total amount of expansion from these two alloys was not so different, though the one which contained 3.50 per cent of zinc cut a little finer and annealed a little more, had the preference, and ceased moving any appreciable amount after the first six months. The one containing only 1.25 per cent of zinc continued to expand much longer than the one containing 3.50 per cent of zinc, I think for no other reason than that it was cut coarsely, which resulted in its being more incompletely amalgamated at the time the test was made, and the simple fact that it did not contain *more* of the constituent which amalgamated easily.

SOME CONCLUSIONS THAT MUST NECESSARILY BE DRAWN.

1. The best manufacturers are conscientious and justified in making claims of superiority one over the other.

2. Many of the best manufacturers are measuring their alloys by

different standards, which often results in one claiming superiority over the other, while the superiority thus claimed was made at the sacrifice of some other property.

3. If a public means for protecting the profession were instituted similar to the one in the medical profession, the results of which are published in the *Journal of the American Medical Association,* these claims of superiority would be well understood.

4. That zinc is not as much of a disturbing element as incomplete amalgamation and imperfect annealing.

5. That temperatures of 130° F. caused by hot foods and drinks, facilitate the diffusion of loosely and uncombined mercury.

6. That alloys made after the plan of the two previously mentioned must be cut finer, regardless of the decrease in strength, and dentists must work them more thoroughly if a *greater* degree of stability to our amalgam fillings is to be obtained.

7. That alloys which are advertised to expand only 1-10000 of an inch do this during the initial setting, and that this expansion is increased during the final setting.

The Strength of Our Alloys Varies.—I have just discussed how a filling which was advertised to give only a slight expansion could result in an enormously expanded one after some months because of the incomplete union of mercury and alloy, accompanied by increased temperatures in the mouth.

I think you have all observed that many of your fillings have more than filled the cavity, appeared spheroid, and the borders been raised after a year or two, hence, you can easily comprehend that a change has taken place.

I desire now to call your attention to the same kind of a phenomenon which occurs in the strength of this class of alloys.

Many of you have observed that many old amalgam fillings cut more easily than new ones. Let me now discuss the changes in strength which have occurred up to date in two of our best quick setting alloys. On the 20th of January, 1906, I made two hundred fillings from two of the best alloys I could purchase. They were made in a mold, which held five fillings and worked exactly as I did the tests previously mentioned. Five fillings were thus made at one mix and the mass was kept moving by my assistant

while I was packing, not allowing it to lie still a moment before it was packed.

Six of these fillings were broken at a time with the dynamometer, at varying intervals, from that time up to the present time. An average of the six fillings thus broken was taken as the crushing resistance of the alloy at that time.

Alloy No. 1—	Per cent.	Alloy No. 2—	Per cent.
Silver	68.00	Silver	65.50
Tin	26.50	Tin	25.50
Copper	4.20	Zinc	3.00
Zinc	1.30	Copper	6.00

Age of Alloy.	Crushing Resistance. Alloy No. 1,	Crushing Resistance Alloy No. 2,
1 day	435 lbs.	452 lbs
2 days	478 lbs.	462 lbs.
4 days	485 lbs.	453 lbs.
24 days	493 lbs.	447 lbs
42 days	497 lbs.	447 lbs.
85 days	475 lbs	433 lbs.
205 days	414 lbs.	367 lbs.
341 days	344 lbs.	310 lbs.

First, let us notice that the alloy containing the higher percentage of silver did not reach its maximum strength until some time after the one containing the higher percentage of zinc, though it was higher when once reached.

We will now recall the fact that in the test previously given for permanency of form, the alloy containing the higher percentage of zinc stopped expanding some time before the one containing the lower percentage. A similar phenomenon occurred here, the one containing the higher percentage of zinc reaching its maximum strength first.

These two tests illustrate, as do a multitude of others that I have made, that the time when the maximum strength of an alloy is reached depends entirely upon the ease with which it amalgamates, and this, obviously, depends upon the composition of the alloy.

We will further notice that the filling is strongest when only

a part of the fillings is dissolved in the mercury. Rarely, indeed, do we get much strength to a filling made from this class of alloys within the first twenty-four hours and usually forty-eight hours lapse before the maximum strength is even approximated. As we have just noticed, it may be a month or two after which time the strength begins to lessen. We can imagine, from our present knowledge of the effect of mercury on its alloys, that such a change would take place in the strength of our alloys.

If we could limit the action of mercury to the surface of each little particle of alloy we would thereby obtain a filling composed of little particles of alloy held together by a cementing substance.

Since the filling of the alloy are much stronger than "the fillings of alloy and mercury combined," to make a cementing substance, we would by thus limiting the action of mercury to the surfaces of the filling, obtain a much stronger filling, and at the same time make another great stride by obtaining a filling more permanent in form.

Copper Alloys.—The copper alloys furnish us very striking examples of what may be accomplished in permanency of form by either completely uniting the mercury with the filling or by limiting the action of the mercury to the surface of the filling.

How many of you ever saw a copper amalgam filling that had expanded or was in any way distorted? Certainly, none of you, because in one method of preparing the alloy the copper is completely united with the mercury, while with the other method of preparing, the mercury is limited to the surface of the fillings.

You have all seen copper amalgam fillings that had apparently washed or dissolved away. This is a common occurrence because copper, while it retains its luster very well in the dry air, is quickly covered with a green layer of basic carbonate in moist air, and becomes blackened by contact with sulphuretted hydrogen.

Either the carbonate or sulphide would be dissolved or worn away only to leave a new surface to be attacked again. A continuation of this process gives us what is commonly called "cupping-out" of copper amalgam fillings.

From this little diversion let us return to the permanency of form of copper amalgam fillings. If we try to unite copper and mercury directly at any temperature possible in the mouth, we

meet with failure. They do not unite. However, copper does with mercury at these temperatures when aided by the electric current or acidulated solutions.

The maker of these alloys may unite them by either means he chooses, and all that is required of the dentist is to heat the alloy and insert it, after which it slowly recrystallizes.

If he has completely amalgamated the two in definite chemical proportions to form the compound (Cu Hg) there is no expanding, spheroiding, etc., after the mass has been placed in the cavity. These bulk changes, if there were any, took place at the time of amalgamation, leaving us only the coefficient of expansion to contend with. Since only a low temperature is required to soften the mass, we practically eliminate bulk changes.

If, on the other hand, the copper amalgam is prepared by triturating copper filings with mercury, and a little mercuric nitrate, only the surfaces of the filings will be attacked.

We have then undissolved filings held together by a cementing substance, a mass which is physically quite analogous to the one so often made from which our high grade alloys composed of silver, tin, copper and zinc, though it is more stable in form, because the undissolved portions of filings are insoluble in mercury alone.

It is not my intention to decry the high percentage silver alloys, and laud the copper alloys, but, rather to show the necessity for a more complete union of the filings and mercury at the time of inserting the filling, since with our high grade alloys, as they are now made, the only alternative is to strive for a more complete union.

It is out of all reason to insert copper amalgam fillings in anything but the most desperate cases, when we have the variety of other materials that modern dentistry affords. Nevertheless, they furnish a most striking example of permanency of form.

Some conclusions:

1. That the strength of alloys varies with age.

2. That they also vary with the amount of alloy dissolved in the mercury at the time of making a filling.

3. That their crushing resistance is *very low* for the first few hours after being made, and is often so for a day or two.

4. That the period of greatest crushing resistance does not last but a month or two.

5. That the decline in the crushing resistance is simultaneous with and dependent upon a continuation of the amalgamation process after the filling has been made.

6. That regardless of this decline in crushing resistance, we should work such alloys more thoroughly, because they are not only more permanent in form, but sufficiently strong for practical purposes.

Plastic Alloys.—One of the great drawbacks to the success of the hard alloys is that a majority have never mastered their working properties.

Scores have tried them faithfully and conscientiously and have done good service with them, while scores of others have catered to their personal likings and demanded easier working, slower setting alloys. Naturally, the manufacturers have responded promptly.

In looking over some of the leading manufacturers' products to-day we find that almost everyone of them is making at least one high per cent silver alloy and one plastic alloy, for example:

Manufacturer—	*Name of High Percentage of Silver Alloy.*	*Name of Low Percentage of Silver Alloy.*
L. D. Caulk & Co.	20th Century	Par Excellence.
Dental Protective Supply.	Fellowship	Ductile.
H. D. Justi & Son	Triumph	White Alloy.
Frink & Young Co.	Permaneo	Standard
Garhardt Dental Mfg. Co	Acme	Standard White
Ransom & Randolph Co.	Micrometric	Success.
Gideon Sibley	Rego	Sibley's G & P.
Consolidated Dental Co.	Superior	Crescent.
S. S. White Mfg. Co.	True Dentalloy	Globe.

And so it goes all through the list of dental manufacturers' products.

The most of the so-called plastic alloys make the most unstable fillings that can be placed in the mouth. They are positively the worst. Their composition is based on the dual movement, 50 per cent of silver and 50 per cent of tin.

To avoid the slight shrinkage which occurs in the early stages of setting most of the manufacturers have added about 1.50 per cent or 2 per cent of zinc. They have been success-

ful in this respect, though their crushing resistance is low, they flow badly and are cut coarsely.

A coarsely cut alloy composed of about 1.50 per cent of zinc and the remainder equally divided between silver and tin, is free from shrinkage, retains a good color, and works easily, but is capable of more expansion in the mouth than anything I know of.

Let me suggest a test which any of you can try. Prepare a cavity in a fairly strong extracted tooth and fill it with one of the plastic alloys. Let it set twenty-four hours, after which polish the edges smooth and make the center of the filling level with the borders, so that you can detect the spheroiding caused by the expansion of the alloy. Place it near a heater, where the heat approximates 130 degrees F., and leave it there a week or two. If you are fortunate enough to have some test tubes, a micrometer and a thermostat, by all means use them.

First notice that the tooth is sufficiently strong to resist the expansion of the alloy, and as a result you get a spheroided filling, caused by the lateral and downward expansion meeting with resistance in the walls of the cavity, thus directing these forces toward the center.

Let the filling remain near the heat as long as you get an expansion, and see if you are not surprised at the amount. It is not my intention to cast aspersions at the makers of this class of alloys, since almost everyone of them have a better alloy, which he is perfectly willing and anxious to sell. It is, however, a reflection upon the man who uses them, and anyone of you can by a little observation detect them in a short time.

Different Methods of Determining Shrinkage and Expansion.—Another thing of which I wish to speak is the proper method of measuring shrinkage and expansion. When prominent men write articles for our foremost journals, in which they state that such alloys as 20th Century, Fellowship, Acme and True Dentalloy shrink, I think it is time for disinterested parties to explain *why* such results were obtained.

When Townsend's alloy, which at the time the article was printed, April, 1905, was composed of 42.02 per cent of silver, 57.56 per cent of tin and .42 per cent of copper, is claimed to

be free from shrinkage, and the above-named alloys are said to shrink, I am sure that it is another case of measuring a product by different standards.

When it is claimed, not only by the writer of this article, but by others, some of whom are here in your city, that the specific gravity method is the right one, and that the products of some of our very best manufacturers shrink, we must all "take notice," since I am just describing to you how the most of these alloys expand indefinitely.

Even the most casual observer must be impressed with the injustice of such contradictory articles, which serve only to confuse the general practitioner.

The writer of the article previously mentioned found these alloys to shrink when tested by the specific gravity method, while I have every reason to believe that the makers of these alloys tested them with the micrometer and found them to expand. The general practitioner asks, "Which one is right?"

I am willing to admit that the micrometer gives only linear measurement, and that excessive expansions may be obtained by converting lateral expansions into a flow of the metal upward by making the tests in sufficiently resistant receptacles, and, further, that the specific gravity method of determining shrinkage and expansion is the one generally adopted by physicists.

However, I am not ready to admit that the micrometer is not the proper device for measuring the shrinkage and expansion of dental amalgam alloys. Let me call your attention, if you have not already noticed it, to the fact that shrinkage may be either a change in volume or a change in dimensions, and that the two are distinctly separate in some parts of this work. In other words, the volume of a body may be either "real" or "apparent," the real volume being the space occupied by the actual substance of which the body is composed after making all allowance for the pores or interstices that may be present on the surface of the body, while the apparent volume is the space included within an imaginary surface which just takes in the body interstices and all.

If we determine the amount of water displaced by a certain piece of material we say "we have determined its volume." If

we cut some holes in the surface of this "same piece of material" and then immerse it in water, we find that it displaces much less water than it did before, naturally we say its volume is less, but we have not changed its dimensions one iota.

When an amalgam filling is packed in a cavity or other receptacle the surfaces are smooth and glistening with mercury, which has been forced there by pressure applied to the center of the filling. All pores or interstices which may be present on the surface between pieces of undissolved alloy are filled with mercury, making the surface bright and smooth.

If we examine these surfaces a few hours later we find the same places which were particularly smooth and bright now roughened and covered with pores and interstices. This is seen with the naked eye when working with coarsely cut, imperfectly annealed high per cent silver alloys, which dissolve so slowly that there is but little alloy dissolved in the mercury at the time of mixing.

It is quite evident that if an amalgam filling made from 20th Century, Fellowship, Acme and True Dentalloy, or any others of this class, were subjected to a specific gravity test, they would show a decrease in volume, especially if they were amalgamated about half enough, thus leaving large particles of alloy undissolved. This test would measure the pores and interstices formed on the surface during the first few hours, caused by absorption to the center and dryer parts of the filling of the mercury, which filled these pores during the first few hours.

On the other hand, if these same alloys were worked thoroughly and measured with a micrometer, they would show an increase in the dimensions. I therefore find it true in my work that a given alloy which shows a slight expansion in the early stages of the setting when measured with the micrometer will give a slight shrinkage if measured by the specific gravity method. In other words, the dimensions may increase and the volume decrease at the same time.

From what has been said it may be seen that those who use a micrometer regard shrinkage as a decrease in magnitude measured along a diameter, while those who use the specific

gravity method regard shrinkage as a decrease in volume, which includes the pores and interstices formed along such a diameter. In other words, the men who use the specific gravity method are measuring the mercury which is being taken from the surface to the center and dryer part of the filling forming the air spaces on the surface out of what was a few hours before filled with mercury.

In conclusion, let me briefly speak of the air spaces spoken of and shown you by Dr. Callahan, of Cincinnati, at your March meeting. He showed you that these spaces were not only on the surface, but along the margins of your fillings. You observed them on the screen. You talked about them in your discussion, they are certainly there. Dr. Black stated that "the best method of making amalgam fillings tight is to use all the force you can and pack it along the walls with a very small instrument," and "if we could work amalgam as well to the walls of our cavities as we can gold, it would stand as well," that "fillings may contain as much as 12 per cent of air." The statement of Dr. Black that we should use plenty of force and pack the alloy along the walls with small instruments is certainly one to be considered.

The one made by Dr. Callahan with regard to the rotary burnisher is not to be ignored, since it, too, gives a thoroughly packed filling, though I would add to both statements that the air must be well removed from the mass by thoroughly working it.

The statement of Dr. Black that "if we could work amalgam as well to the walls of our cavities as we can gold it would stand as well" represents in a general way the feeling of the whole profession to-day. A large per cent of the men of the profession feel that their successes are due to their getting the filling well packed and their failures due to the lack of adaptation.

There is no doubt but that this is true in many cases, though I most firmly believe that it is not quite the root of the evil, nor the real reason why amalgam is a poorer filling material than gold, for the following reasons:

1. Our present amalgams will not lie still after they have been inserted in the cavity and the borders finished. There is

absolutely no reason why they should when the alloy is but partially united with the mercury at the time of mixing and mouth temperature is sufficient to allow the union to be completed, remembering, of course, that all chemical actions are either retarded or accelerated by changes in temperature.

Gold does lie still after being placed in the cavity. There is no mercury or other substance to unite with it. It simply welds in the cold.

2. Amalgam fillings are both oxidized and sulphidized in the mouth. These oxides and sulphides are dissolved or worn away, causing a loss in material. When this loss of material occurs at the border of the filling it no longer fills the cavity and often presents a very ragged edge. Gold is not oxidized and sulphidized in the mouth. Its borders are immune to the attack of almost everything. I have called your attention to a few of the more glaring misunderstandings and trust that this society will use its every influence to bring about a means of settling them and protecting the profession against the use of poor alloys.—*Dental Review.*

THE BANDED VERSUS THE BANDLESS CROWN. By Samuel Doskow, D.D.S., White Haven, Pa. The subject of root-crowning has attracted the attention of the profession from its earliest history, resulting in a multiplicity of methods and conflict of opinions too numerous to mention, That inherent human characteristic—the individual's belief in his particular way—is a condition that always has obtained and probably always will. The spirit of this persistence is regrettable as a factor in impeding progress and lowering the dignity of discourse. One truth, however, is made apparent by this crown controversy, in that, in this conflict of opinions, the absence of a scientific standard of measurement is still clearly apparent. The monthly review of methods or modifications of details all show a dickering with a superstructure based upon the original principle—which is probably wrong, and therefore susceptible of indifferent refinement.

Beginning with the pivot teeth of Fauchard and Dubois de Chemant, the wooden pivot teeth, and the crowns of Richmond, Bonwill, Logan, Downey and Davis, we can trace distinct phases

in development. The apparent faults of one were overcome in the other, and so on down the whole line, each according to his ingenuity and skill in production.

While some general methods were thus evolved that are applicable in a majority of cases, yet strictly speaking, no one method in vogue is applicable in every case, either because of some fault in the principle underlying it, or through the lack of ability in the average practitioner to produce that which nothing but the highest skill is capable of accomplishing. It is readily seen, therefore, that something different from the methods practiced at present is needed, in order that one method applied with the average skill may answer for every case.

It is interesting to note the different attitudes taken by the leading dentists in regard to this subject, the more so since the entire profession is divided into different camps on this point in particular, consciously or unconsciously following the lead of one or the other. For instance, Dr. Walter H. Neal makes a radical and thorough sweeping statement against the use of the band around the root in the making of crowns. His denunciation of this method is so sharp and bitter that in no place could he find any use for it. Much in the same line, but not so poignant a criticism, comes from Dr. H. C. Register (*International Dental Journal*, February, 1902,), who says that there are many, if not more, roots destroyed by this method of crowning than are saved by it, because of the production of irritation which induces gingivitis, leading to pericementitis and other ills that follow irritation of the pericementum, and that the band should be used with extreme care and only in exceptional cases. Dr. Joseph Head finds cause from quite another standpoint for advising against the use of bands. He claims, and in this he has my hearty approval, that theoretically it is possible to fit a band around a root and make it perfectly smooth with the contour of the root, but is that the case in practice? And if in practice it is not possible, then every band is a source of infection. Nevertheless, in the cases of split roots, he admits that it fills a want that can hardly be filled by any other device.

On the other hand, Dr. Hart J. Goslee writes: "As the result of experience a great majority of the profession now agree that

a crown with a band encompassing the end of the root is essential to permanence, because of the immunity from the penetration of secretions into the joint, the protection to the root from subsequent decay or fracture thus afforded, and the increased stability. Hence it seems needless to more than mention with emphasis that a perfect-fitting band is the first esstential."

Dr. F. H. Metcalf (*Pacific Dental Gazette*) while favoring the bandless crown, yet holds that for strength and durability the banded crown still leads, and claims that with the careful operator it is to be preferred in all cases. And from what I can recall of the teachings of Dr. F. A. Peeso, I gather that every root that is worth crowning at all should have a band around it.

From the data thus quoted, it is no wonder that not only the novice, but the average practitioner, is so bewildered that he does not know the exact course to pursue and is, as stated above, a follower of one camp or another. And yet both are not far from the truth, for if they were, the results obtained by both methods would be far from being as favorable as they really are. For in spite of all the objections to the banded crown, there are probably thousands of cases in which, although the band was employed indiscriminately, everything else having been equal, satisfactory results have followed its use. And on the other hand, especially within the last decade, just as large a number of manufactured crowns have been inserted, that have, from all reports, proved to be likewise satisfactory.

It would therefore be in place to consider the merits and demerits of the various crowns now in use, and to deduce from them a method that would possess all the requirements, viz., strength, durability, esthetic qualifications, ease of construction, and applicability to all cases. To this end I shall refer to all the porcelain crowns on the market under the name of manufactured crowns, as there is not much difference between them, and also because they are familiar to all.

As above stated, the chief claim in favor of the banded crown is that it is more reliable and has a wider range of application. Let us now pass in review the open objections to this form of crown:

First: The proper mechanical fitting of a band around any

shaped body is only possible where the sides of that body are parallel, or as in the case of a cone, where the fitting is done by forcing the band from the point toward the base. Neither of these conditions holds true in the case of a root. In the fitting of a band around the root in the mouth we have to do away with the base of a cone, and the higher the band is carried along the root, the poorer is the fit.

Second: Even if a proper fit were practicable it would be impossible to tell when the band impinges upon the peridental membrane, causing irritation, resulting in pericementitis and the subsequent ills that may follow this disturbance.

Third: The thickness and width of the band that is usually employed, in order that it may effectively produce the results claimed for and demanded of it, are far in excess of the amount of tissue removed by the cleaving away of the enamel, thus necessarily acting as an irritant upon the gum. It is nothing uncommon to find that part of the gum immediately overlying the band congested, purplish blue, and puffy, in those cases where no appreciable recession has taken place, or else the gum so receded as to expose the free edge of the band.

Fourth: The floor of the cap can seldom be formed perfectly flat for the proper fitting of a facing against it, and in order to preserve its surface from checking during soldering. In forcing the post through the floor of the cap preparatory to soldering, a shallow depression is invariably formed that could be, but usually is not, covered by the ordinary method of backing. This depression forms a handy pocket for the trickling down of borax, and is the cause of many checked and cracked facings.

In view of all these objections, it would seem advisable that the profession set to work to evolve a different method. On the other hand, we are supplied through the agency of the manufacturer with porcelain crowns under various names, but which in reality differ very little or not at all in principle. Let us look into the vulnerable points of these crowns:

(1) Bearing in mind the motto laid down by the late Professor Harris that "the base of the crown should touch every part of the extremity of the root," we are at once confronted by a serious objection to this form of crown. How many of us can say, in every

case where a manufactured crown was employed, that absolute contact at all points of both surfaces was obtained?

(2) Granting for the sake of argument that perfect adaptation of the crown to the root is possible, its retention is not thereby strengthened. As is to be expected, the line of cement between crown and root is very thin—indeed, theoretically, it is only of microscopic thickness—and soon dissolves out, thus providing a suitable and inviting space for the invasion of microorganisms. Even if it should chance that the reaction of the secretions of the mouth is such that it will not have any deteriorating effect on the cement, no strength is added to the retention of the crown, for according to the experiments of Dr. Joseph Head, the strength of cement is dependent upon its bulk.

(3) The pin and tooth united is as a lever. The fulcrum is the fixed base over which the lever works, resulting either in the splitting of the root if the pin be made of a stiff material such as German silver, or in the bending of the pin and the forcing of the crown labially, placing it out of alignment, if the pin be made of a soft material, such as platinum. In addition a suitable pocket is formed for the lodgment of food debris, followed by the inevitable destruction of the root.

(4) The number of molds is not sufficient to fit every case. All the crowns manufactured are made from standard—or what are adopted by the manufacturers as standard—molds. Very seldom can a crown be found to suit the case in hand. Time and again do we come across crowns—intended to replace missing incisors—that will be wider than the root mesiodistally and narrower labiolingually, or *vice versa;* while as regards the appearance, nothing better could be desired.

(5) In cases of close bite, or where the natural teeth are very thin labio-palatally, it becomes necessary, in order to comply with the requirements of the bite, to grind away the crown on the palatal surface. The crown is thereby weakened in proportion to the thinness of the porcelain overlying the part of the pin embedded in its body—either baked or cemented in. The breaking of a majority of crowns could be traced to this cause.

(6) The disregard of the anatomical characteristics of the root and of the mechanical value of the pin is shown in those instances

when the patient appears with the crown in his hand and the pin in the root. This is a frequent occurrence with the crown that has a threaded pin, which is screwed into the crown and fastened by cement. It usually breaks even, if the last thread is on a line with the cervical surface of the crown.

(7) The applicability of manufactured crowns is limited to sound roots, where the decay has not extended beyond the gingival margin. It is needless to say that the conservative dentist meets with very few cases that present this favorable condition, for wherever they are encountered the tooth could probably be saved without resorting to crowning.

(8) Although some attempt has been made by the manufacturers to furnish substitutes for teeth placed irregularly in the arch, and especially those cases of overlapping central and lateral incisors, we can safely say that they have not only fallen short of the mark, but have not even approached it sufficiently near to be entitled to the claim of an imitation. Those who have made an extensive use of these crowns will admit the total helplessness of such cases.

(9) Last, but not least, the slovenly effect upon dentists. The number of crowns met with in the mouths of patients where they extend beyond the periphery of the roots and act as irritants upon the gums, and the reverse case, where the roots extend beyond the margins of the crowns and thus are exposed to the action of microorganisms, is so large that it is of sufficient cause to warrant the abandonment of their use.

In the spirit of compromise to the objections to both the Richmond and the manufactured porcelain crowns, another known as the "half-cap crown" was introduced by Prof. W. F. Litch and recently revived by Dr. R. M. Sanger. The advantages claimed for this form of crown are that it overcomes the chief objection to the Richmond, viz., the unsightliness of the exposure of the gold band in front, caused by the recession of the gum, and that it is stronger than a bandless crown in that a large part of the circumference of the root is encircled by a band. This argument is wrong both in theory and principle. The force of the bite is upward and outward, while the band covers only the palatal and parts of the approximal walls, thus not offering any resistance to

the force of the bite. A common result is that with the continued force of the bite it is forced outward, carrying with it the band, and forming, as in the bandless crown, a favorable place for the development of caries.

Another claim made in its favor is that the band of enamel surrounding the root under the gum adds sufficient strength to the labial parts of the root, so that a full band is uncalled for. I think that all will agree that the strength of the enamel, like that of porcelain, depends upon bulk; and that the amount left after the root is ground level with the gum is so little that it cannot be regarded as sufficiently strong to protect the root against splitting. The ease with which it yields to the cleaver is sufficient proof.

And again, even if it were sufficiently strong to fulfill all the claims made in its favor, the adjustment of a band to the palatal half of the root over the intact enamel is a source of irritation to the gum and peridental membrane. Whether it is made according to the method advocated by Dr. Litch or according to that advocated by Dr. Sanger, it is bound to produce the same results as regards the gum and peridental membrane, and in addition forms a lump—bulky and cumbersome to the tongue—on the palatal surface, extending beyond the natural line of the teeth.

Another crown that was devised to fill the need is the Williams crown. It is made by forming a groove around the canal by means of a trephine, and fitting into it a ferrule that is furnished by the dental depots.

The fallacy of this principle is obvious. The root is materially weakened by the circular groove cut around the canal, so that instead of adding strength, which is the main requisite, the root is thereby rendered more apt to split. It is also necessary to bear in mind that roots are not round, and that it is not possible to apply a round trephine in all cases. The difficulty of applying a manufactured article to all cases in the mouth forms as valid an objection in this case as in the case of manufactured crowns.

It is with a feeling of gratitude toward its author that I have undertaken to present before you a crown devised by Dr. P. B. McCullough of Philadelphia. Although it was presented to the profession about five years ago, and has since been demonstrated

before various dental conventions, I can safely say that it is still unknown to a large majority of the profession, and even were it not so, it would bear repetition because of its merit. As stated above, it is a method that will answer for every case and requires no more than the average skill for its application; in this respect the McCullough, or as he terms it, "the burnished cap crown," fully comes up to the standard.

The chief features of merit in this method are that the entire work is done on a cast made from oxyphosphate cement, the strain on the nervous system of the patient and the amount of pain inflicted are reduced to a minimum, and it contains all the virtues of a bandless crown and the advantages of a banded crown.

The root is ground down by means of carborundum stones slightly below the gum margin, following the festoon of the gum,

FIG. 1.

and the remaining enamel is cleaved off. The root is then beveled with a cone bur, thereby converting it into an inverted truncated cone. (Fig. 1.) Any instrument whose strength depends upon bulk, or that has to be used as a lever to form a bevel, is contraindicated for that purpose. In the first place, it is difficult to insert it between the approximal spaces, and in the second place, an instrument that works on a fulcrum will never produce a straight-line bevel, but invariably one that is slightly curved. To overcome this difficulty the cone bur is used. It comes in various sizes, and is therefore easy of manipulation in all places. The approximal spaces as well as badly decayed roots that extend for some considerable distance beyond the gum margin can be reached with it and beveled, as easily as can the labial and palatal sur-

faces. The bleeding from the gums that usually accompanies all operations of this nature is easily checked by a stream of cold water from a syringe, which also cleans the part from the debris caused by the bur.

An impression tube, funnel-shaped, is made from a thin piece of German silver cut in the shape of a keystone, the edges of which are bent together and joined with silver solder. By means of pliers and shears, it is made to fit loosely around the bevel and under the gums. It is then filled with wax to within one-quarter inch of its wide surface. (Fig. 2.) Any cheap quick-setting cement is then mixed to a medium consistence, placed in the tube, and pressed against the face and bevel of the root. The tube is held between the thumb and the first and middle fingers, the other

FIG. 2.

fingers resting against the adjoining teeth or the roof of the mouth so as to keep the tube in balance.

An impression of the root and bevel thus taken, a facsimile of the root in cement is the next desired step. As a separating medium, the soaking of the impression for about ten minutes in formalin or the coating of its surface with glycerin can be employed. The glycerin works better in my hands, and is therefore always used. As the outer edge of the bevel is usually on a line with the edge of the impression tube, in order that a cast of a suitable size may be obtained, it is necessary to form a matrix around the impression. This is accomplished by holding the tube in the corner of a piece of paper about the size of a prescription blank, and rolling until it is well wrapped. A wax thread is wound around the paper tube to hold it in place. The matrix is then trimmed to within a quarter of an inch of the impression (Fig. 3), and the surface of the impression is moistened with glycerin. Any ce-

ment is mixed to a thick consistence and packed into it. It is then held under pressure between thumb and finger for about ten

FIG. 3.

minutes to prevent it from warping. When the cement has set, the matrix is removed, and the cast and impression are separated by pulling them apart.

The excess cement is cut away with a coarse stone, care being taken not to grind beyond the upper edge of the bevel. For the sake of convenience in handling, the cast is mounted on a block of plaster or wood and fastened with hard wax (Fig. 4.)

A piece of inlay platinum of suitable size is placed over the cast, held firmly by the thumb of the left hand, and with a large

FIG. 4.

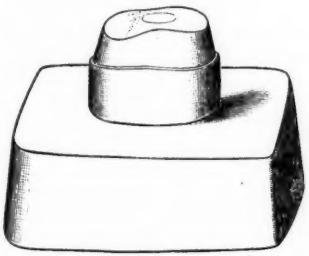
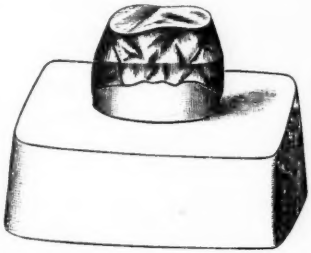


FIG. 5.



burnisher the edges are burnished down the bevel and beyond it. This forms a fairly fitting cap to cover the end of the root. (Fig. 5.) It is now laid aside, and a strip of 22-k. gold, No. 30 gage and about one-eighth inch in width, with angular ends, is measured loosely around the outer edge of the bevel. The ends are joined together with 22-k. solder, and the band thus formed is shaped by

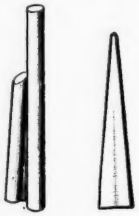
pressing it over the cast. In thus shaping the band, it is always necessary to bear in mind that its walls should be parallel with a line drawn vertically through the center of the cast. The band is then removed, the cap annealed, placed on the cast, and the band pressed into place over the cap, drawing it tight over the cast. The cap and band are then removed and soldered together with 22-k. solder, freely covering the cap with solder from the surface to which the porcelain is to be attached. The overhanging edges of the platinum are then trimmed even with the outer edge of the bevel, and the outside of the band beveled toward the roots. This

FIG. 6.

makes the band perfectly smooth with the contour of the root, and overcomes some of the objections to the banded crown, and in addition restores the amount of tissue removed in preparation. (Fig. 6.)

The pin is formed by filing flat at an angle a round piece of iridio-platinum wire No. 18, about two-thirds the length of the canal, and soldering its flat surface with 22-k. gold to another piece of the same thickness, about one and one-half times its length. (Fig. 7, *a*.) It is then filed flat into the shape of an

FIG. 7.



a *b*

obelisk. (Fig. 7, *b*.) It could also be made from two wedge-shaped pieces of clasp metal soldered together. Thus a pin is formed that will be strongest in the direction of greatest force, and will be equi-distant from the periphery of the root. A hole

is then punched in the center of the cap and enlarged by means of a bur to admit one-half the length of the pin. This is done so as to prevent the turning up the edges when the pin is forced into place.

At the next visit of the patient the cap is placed over the root and—assuming that the canal has been previously enlarged—the pin is forced through the hole in the center of the cap into the canal as far as it will go. By slightly pulling on the cap with thumb and first finger, the cap and pin can be removed together and soldered with 22-k. solder. This is best accomplished by resting the cap over two pieces of charcoal, fire-clay or pumice, with the pin suspended between them, or by previously drilling a hole in the asbestos block sufficiently wide and deep to admit of the free suspension of the pin without any tendency to dislodge it, the edges of the cap resting on the block.

The pin being soldered fast, and providing a hold for the fingers, the cap is held against the flat surface of the lathe stone, and the band extending beyond the cap is ground flat at the angle that

FIG. 8.

will be narrowest labially and widest palatally. It can usually be ground so that labially the band will be cut away beyond the inner edge of the bevel, thus insuring the absolute covering of the gold by the gum, and overcoming another valid objection to the banded crown. (Fig. 8.) It also—in the least amount of time—forms a flat surface against which a porcelain facing can be ground to fit accurately.

The section thus completed is placed upon the root, an impression taken, casts made, and the bite taken in the usual way. A facing of the proper mold and shade is selected and ground into place, and attached by means of hard wax. It is now removed from the cast and lines are drawn with a sharp knife on the walls of the cap in line with the flat surface of the facing. To facilitate the removal of the cap and pin from the cast, it is well, prior to the pouring of the cast, to cover the pin with a thin layer of wax. On heating the cast slightly prior to the attachment of the facing,

the wax is softened, and the cap can be easily lifted from its place without disturbing the relationship of the facing and cap.

The next step is the formation of a backing. For this purpose 32-gage platinum is used. It is made to extend at least one-sixteenth of an inch around the free edges of the tooth, and is swaged against the facing by striking a soft wooden stick placed on the labial surface of the facing with a light horn mallet into moldine. This outlines the margins of the facing distinctly, and protects it on the free edges against coming in contact with the flux during the process of soldering. The remaining edge of the backing is cut flush with the ground surface of the facing. For the protection of this surface, crown metal—gold on one side and platinum on the other—rolled to a thickness of 0.001 in. is used. The backing is removed from the facing, and placed on the soldering block, with the surface that comes into contact with the porcelain downward. A piece of crown metal of suitable size is placed over it about one-sixteenth inch below the upper margin of the backing, gold side downward. With the blowpipe the gold of the crown metal is made to melt, soldering the metal to the backing. It is then returned to the facing, and with the finger, the crown metal is bent over the ground surface of the facing, the free edges extending beyond its labial surface. Another advantage gained by the addition of the crown metal is that the gold surface coming in contact with the ground surface of the facing lends to it a yellowish tinge, which at that part of the facing is very desirable. To insure against the probable leak of flux around the pins, in case the holes punched in the backing for their admittance are slightly larger than the thickness of the pins, small washers made of 36-gage pure gold and punched out with a sharp-pointed instrument are slipped over them. The washers are carefully burnished down with an instrument provided for that purpose. (Fig. 9.)

The immediately adjoining teeth in the cast are now partially cut away to allow for the extension of the edges of the backing beyond the margins of the facing. With the lines on the sides of the cap as guides, the facing is waxed into place. It is then removed from the cast and invested. When hardened the wax is washed out with a stream of boiling water. Small pieces of solder covered with borax are placed at the points of contact of the crown

metal and the cap. A few pieces of platinum or clasp metal are placed at the various points in order to draw the solder for the reproduction of the anatomical contour, over which large pieces of solder are placed. The investment is heated up in the usual way, the heat being applied to the under surface of the investment immediately beneath the joint of the facing and the cap, until the small pieces of solder placed at that point melt and flow down, when the flame can be applied on the surface to facilitate the flow of the solder, and the covering with it of the entire surface of the backing. If these precautions are carried out, a most per-

FIG. 9.

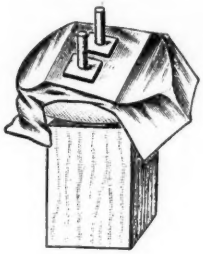


FIG. 10.

fect joint between the facing and the cap will be obtained, and checking of the facing, even of microscopical character, will be avoided.

The incisal edge of the facings to be selected in this work should be of the knife-edge order. When the contour is properly restored with solder, the danger of snapping off a facing during mastication is reduced to a minimum, as the opposing teeth always come in contact with the gold first, and with no unsightly showing of gold at that point.

The excess of platinum and solder is cut away with a stone. The grinding should be done against the facing, as it tends to the production of an absolutely fine joint. It is then finished in the usual way. (Fig. 10.)

In favorable cases, or where the dentist is a porcelain enthusiast, an all-porcelain crown can be constructed on this principle. The cap is made in the way already described. A detachable-pin porcelain crown of the proper shade and mold is selected and

ground flat to fit the flat surface of the cap. The detached pin is cut, the part belonging to the crown is replaced in the space provided for it in the crown, and filed flat with the base of the crown. A small piece of hard wax is placed on the pin, the cap is heated, and the crown placed on it. In a minute the crown is removed from the pin. The latter, waxed in place to the cap, is removed with it from the cast, invested, and soldered. The crown is then

FIG. 11.

fastened to the pin and the cap with cement. When set, it is ground wherever necessary in order that it may fit flush with the cap. (Fig. 11.)

In cases of edge-to-edge bites we have observed that a porcelain crown attached to a cap will in some instances hold better than a soldered crown. A case that came to my notice about a year ago illustrated this fact plainly. Both upper central incisors were replaced with crowns by different dentists. One was a Richmond crown, and the other a porcelain crown attached to a Richmond cap. The latter did good service for about five years, while the former only lasted one year. While one case is not sufficient data for conclusive purposes, yet it is worth bearing in mind and comparing it with other cases that may be heard of from time to time. —*Dental Cosmos.*

REPLANTATION. By W. G. Ebersole, M.D., D.D.S., Cleveland, O. The surgical treatment of root canals, which for some reason has not been, or cannot be, successfully treated otherwise, is a question which has been of great interest to many members of the profession for a number of years.

Early in the professional career of the writer many cases of long standing alveolar abscesses were brought to his attention.

Having a great deal of time on his hands, as do most beginners, he turned his attention to treatment of these chronic cases.

That comparatively few cases of chronic alveolar abscesses require surgical treatment is an indisputable fact, but that there are a few cases which come into our hands which defy all other treatment is true, and it is our intention in this article to discuss the treatment of inaccessible root canals of teeth which cannot be successfully handled otherwise than from a surgical standpoint. In this connection should also be classed those root canals in the treatment of which the operator has unfortunately perforated the walls, and has been unable to repair the damage so successfully; here, too, should be classed those teeth which, due to some unfortunate cause, have been led to assume a position in the arch, of such nature that the orthodontist does not feel that he can successfully handle them.

Fully aware that a large number of teeth that were being sacrificed annually because of the failure of other lines of treatment, the writer was led to adopt heroic methods to prevent the loss of a number of anterior teeth which had been treated by competent operators and pronounced incurable.

Careful study and investigation as to the final results obtained in the amputation of the root was made, with the result that this class of treatment was placed in a very unfavorable light.

The question of replantation was gone into very thoroughly. A careful study of the writings of members of the profession, who had operated at various times, and free discussion of the same was had with various members of the profession as to the results obtained from such treatment. Evidence obtainable in these directions was of such a nature as to lead to a declaration against the general adoption of this class of practice in handling these annoying cases.

The case which finally drove to making a decided effort in saving this class of teeth was that of a beautiful young lady who presented with the upper left central incisor elongated a little over a quarter of an inch, and extending out of the arch anteriorly at least an eighth of an inch. An examination revealed, otherwise, a most beautiful and perfect set of teeth. But the presence of this tooth in the position which it occupied was such

as to destroy to a very marked degree the beauty and harmony of the general features of the patient. The young lady had been in the hands of a number of members of the profession for treatment, and various means and methods had been tried without accomplishing permanent or satisfactory results. When the patient was presented, it was with the intention of having the tooth removed, and a substitute supplied. This we would not hear of, and referred the case to a specialist in orthodontia, who, after careful examination and consideration of the case, decided that it was one in which results of a permanent nature could not be accomplished, and referred the patient back to the writer. Upon going into history of the case, the writer learned that some three years prior to the time he saw the patient, the young lady had been playing with a dog, when the animal leaped and struck her in the mouth with his head, loosening the tooth in question, which in time, again became firm in the socket. For some time no change in position was noticed, but finally the tooth began to elongate. When the case presented examination revealed the fact that the pulp was still alive, and performing its normal function. After hearing the history of the case, and finding all the tissues around the tooth in a seemingly healthy condition, the writer and the orthondontist held a consultation, at which time the writer proposed the question of replantation; the removing the tooth and deepening the socket sufficiently to bring the tooth back into position and supporting it with retaining apparatus.

The question was again gone into very thoroughly, and the results of replantation carefully investigated. In going over the literature at command, and in getting the statements of members of the profession who had attempted replantation, it was learned that in all cases the roots had either been scraped, removing the soft tissues and then sterilized, or they were placed in very strong sterilizing agents prior to the return to the socket, and it occurred to the writer that by these means the peridental membrane was either entirely lost, or its function completely destroyed by the strong antiseptic used, and that to this was due the eventual loss of these teeth.

Having witnessed a number of operations performed for skin grafting during his career in the medical colleges, the thought

occurred to give the peridental membranes the same treatment and we agreed to perform the operation in the case mentioned as an experiment pure and simple.

Accordingly the patient was brought in and anesthetized, the tooth extracted, the pulp removed and the root canals filled, the alveolar socket with difficulty drilled to the proper depth and size to permit of replacing the tooth in the original normal position. Considerable difficulty was found in burring out the osseous growth of tissue which had forced the tooth into the faulty position. This new formed tissue was found to be very dense and hard, differing very much from the normal alveolar tissues. During the entire process of the operation careful attention was given to keeping the membrane upon the root of the tooth thoroughly moistened with the normal saline solution. Great care was taken to avoid contamination from an external source, and when the alveolar socket and the root were properly prepared, the tooth was quickly forced into position after having been dipped into a solution of sterilized water and glyco-thymoline, about one of glyco-thymoline to ten of water. The tooth was properly held into position by one of the most modern retaining appliances known to the orthodontia specialist, with the result that the tissues were soon in a normal condition, the tooth became firmly fixed in the arch, and it was practically impossible to tell that the tooth had not been in a normal condition, or that the pulp had been removed from the same, excepting by careful examination. The results were of the most gratifying nature.

This case, with a thorough description of the method of procedure, we presented to the Cleveland Dental Society, some nine years ago. At the time, very high compliments were paid as to the result of the work, but the prediction was made that sooner or later the tooth would be lost owing to the absorption of the root and the statement was made that this would take place within three to seven years. At the time, while the operator was very enthusiastic over the results he had obtained, and of the very firm conviction that the result would not prove as predicted by his brother members of the profession, he felt that owing to the history of replantation it would be unwise for him to make any

declaration as to the successfulness and probable future of this class of work.

Believing that there was a great field to be worked out in this line, and having plenty of time at command, he then took up a series of experiments to ascertain what attitude nature would assume in this class of treatment. And now after a little over nine years of experience in this work, the results of which have been of the most gratifying nature, he is led to make the statement, that replantation properly performed, is not only a proper procedure, but is of the most enduring nature.

The results obtained in the case just described were found to be as perfect a year ago as had been the result a year following the operation. In experimenting in this work in order to ascertain what nature would tolerate, the writer was greatly surprised by results obtained in cases which it did not seem possible could result in anything but failure. Many roots of long standing diseased conditions were removed, and the end amputated, or an irritant removed, the root replanted. Cases where the teeth had become loosened and forced into faulty position due to abnormal conditions were also removed and treated and replaced in the course of our experimenting. As a result, it was learned that there was a bright outlook for replantation. In no case where a large portion of the normal peridental attachment remained intact prior to the operation was there not a firm attachment following the operation. In two or three cases where the peridental attachments had been almost entirely lost and grave pyorrhea conditions existed and teeth were removed and replaced, the attachment sufficiently strong to support the tooth failed to occur. In fact, some of these operations were performed with no hope of obtaining satisfactory results, and were simply performed with a view of finding what steps nature would take in attempting to care for such conditions.

The writer has recorded some 73 cases of replantation with a record of the loss of only five teeth up to date. From this, when you consider the fact that these operations date back over a period of nine years, and that in a number of the teeth and roots so treated, the cases seemed hopeless to start with, it will be found that the percentage of loss is not large. That a greater number of

teeth have not been lost we are not prepared to say, for it is true that a number of the cases which we handled earlier in our experience have been lost track of, and still another number of these teeth have not been in a sufficient number of years to demonstrate that they may not be lost as were the teeth which we replanted in the old manner of performing such operations.

With a fair idea of the results obtained, we will proceed to describe a few of the cases which give a general idea of the extent to which this work can be carried on.

Case No. 1. We have already described this case with the exception that we did not state that the age of the girl was twenty-four years, and did not give in detail the technique of the operation. This we will, however, do in the description of case No. 3.

Case No. 3. Mrs. R——, aged 33, Aug. 11, 1899, presented with an upper left lateral incisor which had a chronic abscess of four years' standing. The patient had been in the hands of two or three first-class operators for relief, and by each had been pronounced incurable without the loss of the tooth. The crown was in a fair condition, and the rest of the teeth were fairly well preserved, but contained a number of medium sized gold fillings. The tooth in question had been filled several years before on the distal proximal surface with a large gold filling which later caused the death of the pulp. We, as others had done, attempted to treat through the root canal without being able to stop the flow of pus. After careful examination and treatment, we were led to believe that some one of the former operators had drilled through the side of the root, near the apex. As a last resort it was finally decided to extract the tooth and replant same, if it were thought advisable. An anesthetic was administered, the tooth removed, when it was found that the diagnosis was a correct one, a hole having been drilled through near the apex of the root, at which point there was an abrupt curve which prevented successful treatment, the bend being almost at a right angle. The tooth was removed and dropped into a warm normal saline solution for a few moments; it was then taken out and wrapped in antiseptic gauze saturated with the warm normal saline solution, great care being used to keep it both warm and well moistened. The curved portion of

the root was removed, and the root canals treated and filled with chlorapercha and guttapercha points which were forced through the apex and sealed with hot instrument, afterwards smoothed and polished, using sand paper and polishing discs. Throughout the operation the tooth was dipped every few seconds into the normal saline solution in order that the function of the pericemental tissues might not be destroyed. When ready to replant the tooth, the alveolar socket was washed out with warm saline solution in order that any clotted blood which might remain in the socket might be removed. An anesthetic was administered, the surface of the alveolar socket irritated to produce a copious hemorrhage to furnish immediate nutrition to the pericemental membrane. The tooth was then forced into position and anchored rigidly by the use of brass wires which are specially prepared for the use of the orthodontia specialist. The patient was dismissed and instructed to use peroxide of hydrogen, one to four of distilled water, to be followed by a solution of glyco-thymoline, one to four of water, to be used every hour during the daytime, and as often as convenient during the night. Instruction was also given to return the next day to have the mouth thoroughly sprayed, by the use of compressed air and atomizers, in order that the tissue might be kept in a healthy condition. This course of treatment was kept up every day for the first week. Second week patient required to return every other day for atomizer treatment. At the end of the second week all but home treatment was discontinued. At the end of the third week the wires were removed and the result found to be most gratifying. This case was examined some three months ago when the tooth was found to be in perfect condition with absolutely no indication of any displacement or signs of loss; it seems as sound and firm as any of its mates.

Case No. 5. Miss Hattie H——, age 27, Sept. 4, 1889. Upper left cuspid root. Chronic abscess of about five years' standing. Patient had been very neglectful of her teeth in general; mouth was found to be in a very faulty condition generally. Entire crown had been lost from tooth described some three years prior to time the case found its way into our hands. There was a decided loss of the osseous tissue around the apex of the root, and

the pressure of the finger upon the lingual side at the base of the root produced a copious flow of thick yellow pus on the labial side. The lady presented with the view of having her teeth put in good condition. It was a question of when and where extraction should cease and crowning and filling begin. The six anterior teeth with the exception of the cuspid were in a condition that would permit of their being filled with fair chances for a long and durable service. It was noticed that when the young lady smiled or laughed she would show quite a large portion of the gums above the crowns of the teeth, making it decidedly inadvisable to use an artificial substitute for cuspid on the plate. All other methods of treatment were adopted prior to bringing up the question of replantation, but failing in these, the matter of replantation was brought under discussion, and finally resorted to for relief. When the tooth was removed, it was found that the apex was covered with a very large abscess sac which, when removed, revealed a broken broach protruding about a sixteenth of an inch beyond the apex of the root, and that due to a long existing condition there had been deposit of serumal calculus at the apex of the root, extending down about one-eighth of an inch. This was removed, and the abscess sac scraped from the root, using the utmost care not to denude the membrane attachment from any portion of the root other than the end where the deposit was located. The denuded apex was amputated, and the operation performed as above described.

This tooth was replanted as the others above, with most gratifying results. This case has not been seen since 1904, but at that time was in most excellent condition, supporting a Logan crown.

Case No. 7. Mrs. H——, aged 34, presented in October, 1899, with a superior right central incisor which had elongated about 3-16 of an inch, and had protruded beyond the arch almost an eighth of an inch. This patient had been suffering from pyorrhea alveolaris, and had been under the course of treatment for some time in other hands. At the time the case presented, there was no sign of pus formation around the teeth except the one in question which was decidedly loose, and which, although wired, could not be held at absolute rest, owing to the fact that in closing

the mouth the inferior incisors struck it with considerable force. Case referred for replantation. The anesthetic was administered, the tooth removed, when it was found that all the peridental membrane had been destroyed except from about 1-3 of the lingual aspect of the root, and for a short distance around the apex. The pulp had been alive, but in a somewhat congested condition. This was removed, the root canals filled, and the alveolar socket deepened, the tooth placed in normal position and anchored. The treatment of this case was the same as that above described, and wires removed at the end of six weeks, when the result seemed to be most gratifying. For seven years this tooth remained in position giving absolutely no trouble up to that time; about this time, while playing with a child, the patient received a severe blow in the mouth, when the tooth become sore, and finally loosened. The case failed to respond to treatment, and later it was lost, when it was found that much of the labial surface of the root had been resorbed. The point made in this case is that where membrane was lost resorption was likely to take place. In fact this has been demonstrated in other operations.

Case No. 12. Dr. H.——, February, 1900. Prominent physician, age 36, upper right lateral incisor, chronic abscess of about five years' standing, patient had made every effort to have the root successfully treated with exception of extraction, amputation or replantation. Had been in the hands of some of the ablest and most successful men in the treatment of root canals the country has produced. The case presented in December, 1899, and was treated till the latter part of January, when replantation was decided upon. Tooth was removed, and a broken broach was found projecting in tissues for about a quarter of an inch. Serumal calculus formed over a portion of the ends of the root; this was removed, tooth replanted, and the pus ceased, and the tooth became very firm in the arch, but for about two and a half years there was a slight discharge of serous fluid through a little fistula, which had been formed in the roof of the mouth, but at no time after the first few days was there a sign of pus. It was found that there had been a great loss of osseous tissue in this case, and several small particles of necrosed bone were subsequently removed. At the end of the three years the fistula healed, and at the present

time the tooth is performing its normal functions with every indication that it will remain in activity as long as its fellows in the arch.

Case No. 19. Mrs. B——, age 47, May, 1900, presented with upper left first bicuspid which had been crowned some six or seven years prior to this time. Gave no trouble for three or four years, when an abscess formed, fistula established which had been in continued activity up to the time when we saw the case. Removed the crown and found the root canals had been treated and filled. Were unable to successfully open them up owing to the fact that the tooth had been filled with some sort of cement. Unsuccessful, we finally removed tooth, when we found that one of the roots had been successfully filled to the end, while the other had been filled only three-quarters its length. Opened up the end of the root sufficiently to permit our filling it from the apical end, we filled it and replanted. Results most gratifying. Tooth doing good service at the present writing.

Case No. 23. Mr. M——, age 41, inferior left lateral incisor. Pulp removed, tooth treated and root canal filled some year and a half prior to our seeing the case. Attempted to remove gutta-percha filling, and treat. After repeated efforts to clean out the canal, finally unfortunate enough to perforate the side of the root. Was unable to successfully treat, extracted and found root obstructed in such a way it was impossible to get into it by any means then at command. Amputated apical end, reamed out the canal sufficiently to fill it from the apical end, replanted, tissue healed at once, tooth doing good service.

Case No. 24. Mrs. B——, age 52, presented June, 1902. Superior right first bicuspid, abscess extending over a year. Patient had been in the hands of one of the most competent operators who was unable to accomplish results in treatment, attempted to get through the apex and drilled through the side of the root.

Tooth removed, damage repaired with guttapercha filling, the unfilled portion of the root canals were filled, replanted, results perfect.

Case No. 38. Mrs. D——, age 39, March, 1903. Upper left lateral incisor, chronic abscess. Very loose, fistula open both on the meisal and lingual sides from which the slightest pressure

produced a very copious flow of pus. Had been under treatment for about a year and a half. No improvement. Examination revealed the fact that the root had been perforated in at least two places. Upon extracting for replantation found that diagnosis was correct, had large opening upon the medial side of the root, and another upon the lingual side. Canal had been obstructed by broken broach. The root canals were treated and filled, the perforations repaired by use of gutta percha, root replanted. Immediately quite a decided improvement in the surrouding tissues occurred, but for three months there was still slight flow of the pus, but further investigation showed the loss of tissue had been so extensive that it involved the pulp of the central incisor which was putrescent. This was treated when the tissues at once assumed normal condition, and at the end of a year all retaining apparatus was removed, and the lost osseous tissue seemed fully restored. When last seen in February, 1907, the tooth was doing first-class service, and with every indication of doing so for many years to come.

Case No. 42. Mr. B——, age 43, July, 1903. Upper right cuspid root, carrying a Logan crown. Abscess of some three years' standing. Logan crown temporarily seated. Quite a little loss of tissue. Root very loose. Examination showed perforation of the root. Treated, replantation performed and results gratifying.

Case No. 51. Mr. M——, August, 1904. Case of pyorrhea alveolaris. Several of the teeth showing alveolaris abscesses, three of these teeth being very loose. The teeth removed were lower right lateral incisor, lower right first bicuspid and second lower right molar. These teeth were removed, root canals filled, and apex amputated where necessary, and replanted. Patient was very anemic, and in very poor physical condition. The lateral and molar were almost entirely denuded of attachments, the bicuspid was covered by the peridental membrane over about two-thirds of the surface of the root. Lateral and molar became attached, but never grew serviceable, and were eventually lost. Bicuspid attachment became firm, and when patient died, about a year and a half ago, was in good condition.

Case No. 71. Mrs. K——, age 59, March, 1907. Just re-

covered from severe illness. Examination showed lower left second molar forming an abscess. Physician directed extraction of the tooth for relief. Patient unable to stand pain of attempting to open up into root canals. History—tooth had been filled thirty years preceding by one of the finest operators the country has produced. From description given us, led to believe that root canals had been filled. Examination showed that to remove this tooth would mean the loss of the entire use of that side of the mouth, and as the other side was in very faulty condition it meant much to the patient if it could not be retained. The patient stated that if it were possible to save the tooth she desired to have it done. Explained the possibility of administering anesthetic and opening up into the root. Tooth was too sore to be manipulated otherwise. The anesthetic was administered, and attempt made to open up into the root canals, but was found to be impossible. The question of replantation had been discussed, and decided upon, tooth removed, the linguo mesial canal was found to be filled two-thirds of its length, while the mesial bucco canal was found filled to the apex. The canal in the distal root was filled about two-thirds its length. These were treated, filled and replanted. Tooth wired into position and everything seems to favor a long and active service of this tooth.

I have given in the foregoing cases enough examples to show the possibilities of this work. In conclusion we wish to say that so far as we have been able to learn, no one had, prior to the time we made our first effort, replanted teeth on the same basis as skin grafting; that is, keeping the tissues of the tooth surrounded by a normal saline solution, which prevents their destruction, and also avoiding the use of antiseptics sufficiently strong to interfere in any way with their normal function upon their return to their position.

We are prepared to say that where the root is not denuded to more than one-third of its length of the peridental membrane, replantation can be successfully carried on with a certainty that the tooth will remain in position for a great number of years. It is also a certainty that where the membrane has not been destroyed and very strong antiseptics have been used in the treatment of the

root during the time it is out of the mouth, that absorption and loss of the teeth will surely follow. The writer believes that where the technique described is followed the tooth will remain in the mouth and do as good work as long as any of its fellows which have not been disturbed.

With the possibilities this line of procedure offers, after the exhaustion of other methods of saving teeth, it is a rare case indeed where a tooth cannot be retained and made to do good service for years to come.

We know of no case where any of the anterior teeth need be sacrificed when we consider the advancement that has been made in every department of the dental science and art. With up-to-date orthodontia, with up-to-date operative and surgical dentistry affording every opportunity to save the teeth, or prepare them so they can be retained in normal alveolar and gum tissue, with prophylaxis for preserving the teeth and the tissues around them, few indeed should be the losses of teeth if people will but give the profession an opportunity to do for them. On the other hand, few indeed will there be who will not seek dental services if the profession will but adopt modern "humane" methods in caring for their teeth. Remove the pain element, and twice the number of dentists this country affords cannot do the work presented.

But to get back to replantation, no tooth because of a faulty condition of the root need be lost if replantation is resorted to where over half or two-thirds of the peridental membrane remains intact. This is not an idle statement or a result of one or two successful cases and with too short a time intervening, but is made after many operations made years enough ago to know whereof we speak. It is nine years and over since we undertook this work, and from that time to the present, the results have been of the most gratifying nature.

Recommending this plan of procedure for only those cases which are hopeless as far as other methods of treatment are concerned, we leave you to become successful advocates of replantation by following the plan of procedure laid down.—*Dentist's Magazine.*

THE ADVANCEMENT OF PROSTHETIC DENTISTRY WITHIN THE PAST QUARTER CENTURY. By Hart J. Goslee, D.D.S., Chicago, Ill. To seriously contemplate the changes, developments and improvements along general lines which have occurred within the last twenty-five years, one must necessarily look with amazement upon the marvelous advancement the world has made during this epoch.

As members of a profession which has, within this short space of time, become universally accredited as being a distinctly separate scientific vocation, of a profession which has proven to the world that it was but the outgrowth of necessity, and that it has justly earned the recognition and position which it now occupies, may it not be permissible for some of us to pause at this time and consider the advancement which we, as members, know we have made—and which is generally conceded—from the broadest and most liberal viewpoint, lest we should become too enthusiastic to observe possible deficiencies, or opportunities for still greater achievements?

If such conservative reflection is warrantable, and I believe that it is, it seems to me that in order to arrive at some definite point of reasoning along these lines, we should, first, draw a comparison between the advancement made by this young and vigorous offspring of the parent profession of medicine, during the time specified, and the general advancement embracing the full scope of human efforts made within the same period, in order to arrive at a conclusion as to whether we have cause to be proud or elated, just satisfied, or dissatisfied.

Generally speaking, we certainly have every possible reason to point to our progress with pride, to be elated at our achievements, and to be satisfied with our acquirements; and yet, without any desire to discourage or to be pessimistic, even for the moment, I fear that we also have some reasons for being dissatisfied.

In the light of the recognition which the enlightened world now accords to dentistry, of the importance which it attaches to its mission, of the marvelous strides toward the ideal in the fields of science, hygiene, and surgery which it has made, I would not have you think that I fail to realize and appreciate the breadth and the seriousness of the statement I am impelled to

make, and yet it is made, regretfully it is true, but unhesitatingly nevertheless.

Except for the specialties of crown and bridgework and orthodontia, which are the progenies of prosthetic dentistry, which were born and developed during this period, and which now constitute separate and distinct specialties within themselves; except for an awakening to the correctness of the principles and the practicability of the theories of that great American genius—Bonwill—who labored so earnestly and so patiently during his lifetime to make us believe him; except for the introduction of some few new forms of attachments to supporting natural teeth as a means of obtaining greater stability for partial dentures, the application of which makes it possible to cover less of the soft tissues of the mouth, and thereby do less injury to remaining natural teeth; except for some slight improvements in cleft-palate work, and the mechanical treatment of maxillary fractures; except for the introduction of more perfectly prepared compounds of porcelain, and for the improvements in artificial teeth, general equipment, and other products of the manufacturer, *prosthetic dentistry* in so far as it relates to the construction of artificial dentures and other forms of dental, oral and facial restorations, which was the primitive field, and which still embraces what was formerly known as "mechanical" dentistry, has undoubtedly retrogressed rather than advanced.

By way of reaching some logical proof as to the validity of this statement, let us for a moment indulge in retrospection, and cause the curtain to be raised on the stage of dentistry a quarter of a century ago. As we view the characters of the play at that time, we find that the "mechanical" dentist is the stellar attraction; that of him is demanded, and to him is delegated the work which requires the very highest order of skill, and that, crude as his implements and perquisites are, he is nevertheless competent. The operator, the oral surgeon, the orthodontist, and the specialists in therapeutics and hygiene while playing important roles, are nevertheless subordinated to his majesty, the "mechanical" dentist.

Raise the mantle on the stage of modern dentistry and what changes do we note? We find that the acquirement of a higher

order of scientific knowledge and attainment, together with the development of greater manipulative ability, and the advent of the gold and porcelain inlay, etc., has in this brief space of time placed the "operative" dentist in the most conspicuous part. We find that the orthodontists and crown and bridgework men have grown and developed so rapidly as to cause them to assume the dignity of separate and distinct specialists with a field for further and even greater development. We find all of the other specialties growing, developing and occupying positions of increased usefulness and dignity, and after some little effort we finally discover that the "mechanical" dentist—now called the *prosthetist*—has largely relegated himself to the minor and more or less unimportant part of understudy to all of the others.

Twenty-five years ago the services of this same "prosthetist" were in such demand as to entitle him to occupy the role of star in the dental firmament. To-day it is evident that he is not occupying that position. It would, therefore, seem that the skill regarded as being so essentially important then, exceeded the requirements of the present era. This is not necessarily because more work of this nature was needed then than now, but because the character of the work incident to the building of artificial dentures, and to the making of various forms of dental restorations then was on a higher scientific and mechanical plane than now, and hence greater skill was demanded.

The efforts of the prosthetists then were directed largely to the manipulation of the metals, and as a result the acquirement of skill was constantly developed, instead of being retarded, as it has been, by the indiscriminate use of vegetable bases and commercial laboratories, the advent of which has in a large measure sounded the death-knell of progress and advancement along these lines.

The average dentist, then, was a better mechanical dentist than is the average dentist now, and yet look how all other departments of our profession have advanced. It sounds like a paradox, does it not?

Acknowledging that the advent and subsequent common use of the vegetable bases for artificial dentures has played an important part in this deterioration of skill, yet it is by no means

alone responsible. While guttapercha and zylonite, or celluloid, of which so much was expected, and for which so much was claimed, have practically proven failures, and been abandoned, "vulcanite" still occupies a place of usefulness which makes it a valuable and practically indispensable adjunct. Its use as a means of affording attachment of teeth to metal bases embraces its greatest field of usefulness, however, because of its pathological incompatibility with the soft tissues of the mouth, due mainly to its physical property of non-conductivity. Its introduction has also resulted in the abandonment of the use of single gum teeth attached to the base by soldering—a type of construction which was formerly in common use—and therefore in the achievement of far more hygienic results in the application of gold and other metals to the construction of artificial dentures.

During this era it has also caused the utilization of *aluminum* as a base to be made practicable, and to become regarded as occupying a great range of usefulness for such purposes, thereby affording a possible stepping-stone in the upbuilding of this class of work from the slough of degeneracy.

It will therefore be observed that the judicious and scientific use of vulcanite has not necessarily been the one important factor it is commonly and generally considered to have been in bringing about this condition—this dearth of skill—in such directions, for indeed in this connection let me say that it requires just as much skill and art to build a vulcanite denture *properly*, as it does to construct one of metal.

If this dearth of skill is questioned, let me say that continuous gum work, for instance, was made even better, and certainly more frequently then than now; and yet, during all these years, it has been, and is still to be regarded, as the typically ideal denture; and, furthermore, that better and in proportion more metal dentures, on the whole, and as an average, were made then than are being made now.

If vulcanite is not alone responsible for such retrogression, then to what can it be attributed? What part has the manufacturer of dental supplies, and the commercial dental laboratory, a product of the past twenty-five years, played, and are not dental educational institutions in some way responsible?

While it is true that the manufacturers have made such improvements in their products as to materially lessen the labor, and, perhaps, diminish to some extent the actual skill formerly required, still since the manufacturer cannot also be the artist it would seem that these improvements in methods, in porcelain teeth and bodies, in the preparation of metals and alloys, and in instruments and facilities, should tend rather to increase than to diminish the products of skill resultant from their introduction.

It is therefore my opinion that both of the latter institutions—the colleges and the commercial laboratories—are entirely to blame, and that the colleges are primarily so because of being so largely responsible for the advent of the laboratories.

Of the numerous and varied subjects which are now included in the curriculum of the modern dental college, that of prosthetic dentistry *per se* enjoys a unique distinction, for the reason that it necessarily embraces a study of the metals, their physical properties, and their scientific manipulation, and therefore it is recognized as being the foundation of early dentistry, and the very basis of modern dentistry, and yet it is undoubtedly the most neglected phase of advanced dental education.

With no pessimistic views, or overzealous enthusiasm along circumscribed lines, but, on the contrary, with every desire to acknowledge and show just and full appreciation of the wonderful progress made in dental education throughout the world in the last quarter century, still let us again pause and seriously study the problem as to whether the practical departments have really advanced in the same ratio as have the scientific departments.

While we do not fail to recognize and appreciate the necessity for higher scientific attainments, and for a broad and liberal education in all of the more or less closely allied subjects now embraced in the dental curriculum, let me ask, has the advancement made resulted in the production of better dentists?

Psychologically and theoretically, this question may be answered in the affirmative. The graduates of to-day are more highly educated; their training has been along broader and on more liberal lines; they are constantly being better prepared to enter into the activities of social and civic affairs, and thereby

aid in raising the standard of the profession; in fact, they are in every way better *men,* as a whole, but are they better dentists and are they better fitted to engage in and successfully fulfill their mission?

How many of them are fundamentally equipped to display that remarkable evidence of skill which resulted in the accomplishment of Evans, in prolonging the life of the prince who afterward became the emperor of France; how many Bonwills, Wildmans, Closes, Moffetts, Morrisons and Essigs have we now, and how many Kingsleys, Haskells, Warrington Evanses and Taggarts are growing up in our midst?

The practice of dentistry demands peculiar and somewhat versatile accomplishments. It demands a broad and liberal education, and that degree of culture which results therefrom, under favorable environments, but it also demands an artistic temperament and the proper mechanical training. These latter may, or may not, be present as a natural heritage, but are nevertheless capable of development to a greater or less extent in almost every one.

And here is where the colleges are weak, and why they should be censured, for while prosthetics is undoubtedly the most difficult to teach, because of the fact that no general system obtains, no unification of principles prevails, and no really practical textbooks exist, it is nevertheless fundamentally the most important, and, therefore, as is too frequently the case, cannot be regarded in the light of indifference, delegated to inexperienced teachers, nor taught in a perfunctory manner.

If more attention had been given to the teaching of this subject in the past quarter century, and if a greater degree of appreciation of the importance of a broad knowledge of the physical characteristics of the metals, and of the value of a proper training in their scientific application and manipulation had obtained, it is difficult to calculate the increased amount of skill which would now be possessed by the average dentist, and it is safe to say that the mouths of the populace of the world would contain more metal and fewer vulcanite dentures, and that greater health and longevity would have thereby resulted.

To this dearth of exercise of scientific skill in these lines can

be attributed the advent and growing popularity of the commercial laboratories. Such institutions at best can only be regarded in the light of being a menace to the progress of the profession in its entirety, and yet *they* are not altogether responsible for this because they, also, are the outgrowth of necessity—a necessity, however, occasioned only by lack of confidence and gross incompetency on the part of the profession, together with an absence of high scientific ideals—and when we realize this, and properly educate ourselves first, and then our students, if we be teachers, they will die a natural death, and dentistry, as an art and a science, will be placed on a higher plane.

In this connection I cannot refrain from expressing the view that in my opinion no practitioner is justly entitled to aspire to the sublime confidence of his clientele, nor to exact a large or even moderately good remuneration in the way of fees, who employs ready-made and easily adapted products which require but little, if any, skill, and which afford results that must of necessity be of doubtful character.

Indeed, one of the most certain stepping-stones to that degree of success—both moral and financial—to which every honest man aspires, is to so qualify one's self as to be capable of doing that which he undertakes, and doing it well; and in proportion as he so directs his efforts and energies, in just the same proportion will his success be insured.

Even though the tendency to specialize is growing, and granting that such growth is practicable, that the age in which we live seems to demand it, and that it should therefore be encouraged, yet he who lays the broadest foundation is the better prepared to erect the most substantial superstructure in whatever special direction he may choose.

In stating that "mechanical" or *prosthetic* dentistry has retrograded, you will note that I have made an exception as applied particularly to crown and bridgework, and emphasized the fact that the growth and advancement of this separate specialty has been nothing short of phenomenal. And yet, gentlemen, may I not be permitted to call your attention to the fact that, even in this field, where so many bright minds have contributed toward progress, there has been a lack of co-operation between the work-

ers, and therefore an absence of that classification of requirements, methods and results, without which the whole application of this class of work is still in a more or less empirical stage? This, however, is to be attributed largely to the fact that little or no attention has been given to what may be termed the dynamics of the art, or to the proper classification of conditions and requirements.

For example, there are many ways of making crowns, and many ways of making bridges, and a number of them are good ways. Nevertheless it follows that if conditions in mouths were always similar, we could soon decide upon the one best way of making either a crown or a bridge. But conditions, and therefore the requirements, vary, and so we must have various methods. Thus the scientific selection becomes somewhat complex, since what may be the very best method in one instance may prove an utter failure when applied to another, or without judgment.

The two primary factors in crown and bridge construction are *beauty* and *usefulness*. Beauty depends upon the art displayed in defying detection, and usefulness upon the ability of the finished piece to serve all purposes of mastication without being destroyed or fractured by the force of stress.

It therefore is always a problem in choosing a method, to select that one which will answer these two demands in the highest degree, and it is my view that when there may be a conflict, choice must be given to that mode which promises the most usefulness; yet exactly the reverse is the common rule. Indeed, notwithstanding a deep sense of appreciation of the esthetic, too many operators make cosmetics their chief aim, and only learn their error when that which was at first a splendid looking structure returns broken or mutilated.

As an example, again, it is not an uncommon occurrence to find pieces of bridgework *made entirely of gold* torn away from one or the other, or both, of their abutments as a result of stress. In such instances the operator doubtless made the piece entirely of metal, thinking that he would thereby sacrifice cosmetics for usefulness, which in principle was correct, yet because of a failure to insure sufficient strength by properly uniting the dummies

to the abutments, the entire structure proves a failure, and, only because the dynamic requirements had been overlooked.

It will therefore be observed that there is still room for even further progress along the already well advanced lines of this particular specialty, and also that there is much yet to be learned before empiricism can be removed and the importance of dynamics better appreciated.

After thus indulging my vagaries by calling your attention to further opportunities for promoting even greater growth and development of this class of work in particular, let me now return to my original premise, and, in conclusion, again remind you of the strange and singular phenomena that in the past quarter century all departments of dentistry have advanced with wondrous rapidity *save one;* and that this one embraces the manipulation of metals and the construction of artificial dentures, and is therefore the one which is the very basis of all dentistry; and yet, notwithstanding its great importance, it has assuredly retrogressed.—*Items of Interest.*

STERILIZATION OF WATER AND INSTRUMENTS. By Henry L. Banzhaf, D.D.S., Milwaukee, Wis. A short time since Dr. A. W. Harlan, of New York, described a method of sterilization and disinfection as related to water, instruments and soft tissues, including putrescent pulps. The author gave no bacteriological experimental proofs in support of this theory, yet supposed the instruments to be sterile after they had been treated according to his method. This was determined as follows: An assistant had a wen on the second joint of his left index finger. This and the instrument used in cutting it out were scrubbed in the solution. The wound was dressed with this, lint placed over it and sealed. Healing took place without suppuration. This was apparently accepted as proof of its disinfectant properties. Bacteriologists in general will not accept this proof as conclusive. The results of one experiment or observation hardly warrant so general a conclusion.

The purpose of this paper is to review the work of Dr. Harlan and to add the results of my own experiments prompted by the paper referred to. My conclusions are all based on bacterio-

logical experiments, and they differ materially from the findings of Dr. Harlan. His method of disinfection consists of two parts:

1. *The preparation of sterile water.* This is described as follows: "If you will take a copper boiler or pot and have the interior thoroughly polished and leave the water standing in contact with this surface for three and one-half hours, the various substances floating and dissolved in the water will be precipitated, in consequence of the solution of a small portion of the polished copper surface. This will not affect the taste, *but the water will be sterilized.*" He further adds: "When we want to sterilize water quickly, we take a copper coil, place it in a jar or pitcher of water and turn on the electric current and in ten minutes we will have copper sterilized water for use."

According to this the coil arrangement is *not essential* for the copper sterilization of water, as it only shortens the time necessary for sterilization. This coil arrangement, however, makes the process more complicated, since it is not known whether the final sterilization is due to the copper or whether the heat produced by the electric current or the electrolytic dissociation products of the different chemical substances dissolved in water have something to do with the disinfection. These possibilities were suggested in the discussion of the paper by Dr. Hinkins. In order to avoid this complexity I have in my experiments dispensed with the copper coil and only used the polished copper dish.

2. *The disinfection of the instruments.* Dr. Harlan says: "A pint of copper sterilized water is placed in a glass dish. Add five grains of dried sodium-carbonate ($Na_2 Co_3$) and immerse the instruments (which have been scrubbed with a sterilized brush, in sterilized water) for five minutes, and then rinse them with copper sterilized water in a second dish and dry them with cotton cloths that have been heated to 350 degrees F., and place in a covered glass dish, and they are ready for use."

The experiments which I shall describe have the following object:

A. Can water be sterilized by placing it in a polished copper dish for three and one-half hours?

B. Are the instruments sterile after they are subjected to this method?

A. *Is the water sterile?* The water used was Milwaukee city water, obtained from Lake Michigan, as drawn from the faucet of our chemical laboratory. The water was first permitted to run for ten minutes in order to empty the local pipes before sampling, and then poured into a bottle, which had been previously well cleaned and sterilized in a hot air sterilizer at 180 degrees C. for one hour, and then cooled. From this bottle the water was poured into two dishes of equal size, one of polished copper, the other of porcelain. Both likewise had been previously sterilized by heat. These two dishes were placed side by side and both covered by a sterilized bell glass in order to keep out the dust. The temperature was that of the laboratory. Every hour one cubic centimeter was taken from each of the two samples of the water by means of a sterilized pipette and transferred to a sterilized petri-dish and mixed with 10 cc. of sterilized nutrient gelatine. The technic employed was the same as followed by bacteriologists for the bacteriological analysis of water and which is described in any of the text books on water analysis (Mason, Prescott and Whipple). After the gelatine was solidified the petri-dishes were set aside at the laboratory temperature for forty-eight hours and then the number of colonies was counted. The results of these investigations were as follows:

	NUMBER OF COLONIES.	
	Porcelain.	*Copper.*
One hour	Over 1,000	398
Two hours	Over 1,000	306
Three hours	Over 1,000	294
Four hours	Over 1,000	287 (very small)
Five hours	Over 1,000	200 (very small)
Six hours	Over 1,000	200 (very small)
Eighteen hours	Over 1,000	5 (very small)
Twenty-four hours	Over 1,000	2 (very small)
Forty-eight hours	Over 1,000	2 (very small)

We see from this table: (1) That the number of colonies obtained from the water which stood in the copper dish was much smaller than the number of colonies obtained from the water which stood in the porcelain dish for the same length of time. This proves that the action of the copper upon the bac-

teria in the water is *bactericidal.* This is quite pronounced after the water has stood one hour in the copper dish. (2) In both porcelain and copper the water-bacteria lost a great deal of their vitality after a time. The colonies grown in nutrient gelatine became smaller, indeed so small that a magnifying lens was necessary to count them. This decrease of the vitality of the bacteria is most marked in the copper-water. The size of the colonies found in the water which stood in the porcelain dish was much larger than in the corresponding copper dish. Hence, also in this respect the copper proves to be a poison for the bacteria, restraining their development. While the size of the colonies grown from the water which stood in the copper dish was very much smaller after one hour, the colonies grown from the water which stood in the porcelain dish began to decrease in size only after it had stood there for four hours. Then also a material decrease in the size of the colonies was apparent, probably due to the consumption of the food contained in the water.

3. Although the number of the bacteria and the size of the colonies grown from the water which stood in the copper were very much decreased, nevertheless, a *complete* sterilization was not produced, and after four hours 294 colonies could still be counted with a magnifying glass; after eighteen hours 5, and after forty-eight hours 2 colonies still remained.

A complete sterilization of water when permitted to stand in a copper dish for forty-eight hours, and still less so when it stood only three and one-half hours, according to Dr. Harlan's directions, was not produced.

These experiments were repeated three times. The results were practically identical, the only difference being in the number of colonies.

B. *Is it possible to sterilize infected instruments by Dr. Harlan's method?* In order to test this the following experiments were made:

Instruments were infected by smearing over them fresh cultures of staphylococci and others were infected with cultures of streptococci. The instruments were then dried and thoroughly treated according to Dr. Harlan's method by first scrubbing them with a sterilized brush in sterilized water; secondly, by

placing them in a glass dish containing one pint of copper sterilized water and five grains of dried sodium-carbonate for five minutes; third, by rinsing them with copper sterilized water in a second dish, and, fourth, by drying them with cotton cloths that had been heated 350 degrees F. Accordingly the instruments should now be sterile.

The next step in the experimental work was as follows: (1) A sterilized nutrient agar-agar tube was liquefied and poured into a sterilized petri-dish and solidified. A small roll of sterilized cotton was picked up by sterilized pliers and moistened by sterilized water and carefully rubbed over the instrument. If the instrument is not sterile some of the bacteria will adhere to the cotton. The cotton was then softly rubbed in parallel lines over the surface of the agar-agar contained in the petri-dish in order that some of the bacteria may adhere there, and then the petri-dish was placed in an incubator at a temperature of 37 degrees C. for forty-eight hours. In each instance colonies developed. Some of these colonies were removed with a sterilized platinum wire, brought on a miscroscopical cover glass, stained with methylene blue and examined under the microscope, using the 1-12 immersion. *In each instance the same kind of bacteria were obtained, which were originally used for the infection* of the instrument. The instrument was not sterile.

2. A long test tube was half filled with nutrient gelatine, closed by a plug of cotton and sterilized in a steam-sterilizer for forty-five minutes, on three successive days. The instrument originally infected and treated according to Dr. Harlan's sterilization method, was grasped by a pair of sterile pliers and driven deep into the gelatine *mass.* The tube was closed with a cotton plug and placed aside at a temperature of 20 degrees C. for forty-eight hours. *In each instance colonies were formed around the instrument in the gelatine mass.* Some of these colonies were carefully removed, placed on a microscopical cover-glass and stained with methylene blue. They were found to consist of the same kind of bacteria which were originally used for the infection of the instrument. As before, *the instrument was not sterile.*

3. The same experiments as described under 1 and 2 were

made with instruments which were used in practice in the mouths of patients having pus-formation. Among them were two instruments which had been used in the mouth of a patient who showed very bad syphilitic ulcers. The infected instruments were first softly passed over sterilized agar-agar plates, which were then placed in an incubator for forty-eight hours in order to grow colonies of the different bacteria on the instrument. They were then treated according to Dr. Harlan's method and tested according to 1, on the agar-agar plate and according to 2, in the gelatine tube.

In each instance many colonies developed. These were subjected to a microscopical examination and were found to consist of the same kind of bacteria originally found on the instrument; that is, the *species of bacteria grown from the supposedly sterilized instrument on the agar-agar plates were identical with the species of bacteria grown on agar-agar plates from the instruments which were sterilized according to Dr. Harlan's method. Again the instruments were not sterile.*

I want to state that all these experiments were not made only with one instrument, but were repeated with many different instruments, and in every case the result was the same. *The instruments were found to be not sterile.*

Not only these experiments prove the incorrectness of Dr. Harlan's method of sterilization, but also theoretical considerations prove the same. For example, Dr. Harlan used copper-sterilized water and sodium-carbonate for the disinfection of the instruments. The question naturally arises, why does he use both? Is the object of the copper treatment only to sterilize the water, while the object of the sodium carbonate is to disinfect the instruments; that is, has each of them a different special purpose? Or does some of the copper contained in the water, after having sterilized it, aid the sodium-carbonate in the disinfection of the instruments? Dr. Harlan seems to think the first is the correct conclusion, because he says:

"The dry sodium carbonate is added to the water because this is simple sterile water. It is not water that would disinfect. It is dry carbonate of sodium, but you get sterile water to begin

with, and if you use bicarbonate of sodium in sterilized water it will be all used before you get it to the instruments."

In this instance two chemicals are made to appear as identical, viz., the dry carbonate of sodium and the bicarbonate of sodium, which in reality are different, the first one having the formula $Na_2 Co_3$, the latter one the formula NaH Co_3. Dr. Harlan, however, states that $Na_2 Co_3$, not NaH Co_3 is meant, and so I took this as granted.

If the object of the copper treatment is only to sterilize the water, then water sterilized by any other method must be equally effective. The method of sterilizing water by boiling is certainly quicker, simpler, cheaper and especially what is of prime importance, far more certain than the copper-sterilization. It is difficult to understand why copper-sterilized water should be used. The same mystery surrounds the use of the five grains of sodium carbonate in one pint of sterilized water, which is a solution of approximately 1-1500. Sodium carbonate is only a very feeble disinfectant, as Dr. Hinkins rightly stated.

Dr. Sternberg (text-book of Bacteriology) says:

"*Sodium-carbonate.*—A solution of 2.2 per cent restrains the growth of typhoid bacillus and of 2.47 per cent of the cholera spirillum. The first-named bacillus is killed by four or five hours' exposure in a 2.47 per cent solution, and the cholera spirillum by 3.45 per cent" (Kitasate).

Hence a strong solution of 3.45 per cent of sodium-carbonate is required to kill cholera germs in four to five hours, while Dr. Harlan states that he can disinfect instruments by exposing them for five minutes in a solution which is 1-50 as strong. His explanation that if the carbonate of sodium, when used in unsterilized water, will be all used up before it gets to the instruments, cannot account for the enormous difference in strength and time found by Kitasate for the disinfection by solution of sodium-carbonate. Besides this, Kitasate and the other investigators have used sterilized water for preparing the solution of sodium-carbonate, the disinfection of which they tested, although they did not use copper-sterilized plates, but such as were sterilized by heat.

It seems that the principal disinfection which Dr. Harlan makes use of is done by the thorough scrubbing of the instruments, and

this can be done with any other sterilized water, with or without the addition of the sodium carbonate.

Certain it is that such mechanical cleaning alone will never give the warranty of a perfect sterilization. Whenever this is a requirement then sterilization and disinfection of instruments and materials by heat can with safety be relied upon.

This can readily be accomplished by the use of any steam sterilizer. The Rochester steam sterilizer answers admirably the purpose for which it is intended. After the instruments are cleaned with water, soap and brush, they may be boiled in soda solution, or steamed, as the operator may desire. One nice feature of this particular sterilizer is the fact that after instruments and materials have been subjected to a steam bath for fifteen or twenty minutes the turn of a lever cuts off the steam and admits only hot air to the chamber. By this method instruments are quickly dried and ready for immediate use.—*Dental Review.*

A REVIEW OF THE METHODS EMPLOYED FOR THE RETENTION OF FILLINGS. By H. Herbert Johnson, D.D.S., Macon, Ga. Before proceeding with the main subject under consideration, I wish to explain that while the subject-matter of the paper will of course deal largely with contour gold filling, I would very much dislike to have it construed for a minute that I advocate, even to a small extent, a useless display of gold in teeth. On the contrary, I look upon it as most reprehensible, and advocate and practice the filling of all incipient cavities of decay from the palatal and lingual surfaces where possible. With my efforts constantly directed to the accomplishment of this purpose—endeavors extending over a long period of practice—I have found that it is possible in over 50 per cent of the cavities occurring in the six anterior teeth. It is hardly necessary to further state, except in defense of my proclivities for progressiveness, that I am not unacquainted with porcelain work and all methods of burnished gold work, as cast fillings, hoods, staple crowns, etc

I fully recognize that all of the newer methods alluded to must be practiced by everyone who would render the best service possible to his clientèle, as we have not yet reached a

point where we will not occasionally find a use for contour gold filling, even though we recognize and regret the objectionable display of gold.

It is my belief, and I think I can show conclusively, that the methods of preparing cavities for the reception of the filling material, not only in these display fillings, but in many of the other class, have in the past been attended with a needless destruction of strong sound tooth tissue, which could not only have been avoided, but by the employment of other systems greater strength of retention could have been obtained. To make my

FIG. 1.

FIG. 2.

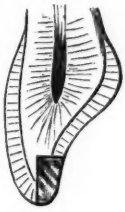


FIG. 3.

FIG. 4.

FIG. 5.

FIG. 6.

argument, if possible, more convincing, I wish to submit for your consideration a partial review of methods of retention as advocated and practiced by some of the leading operators and writers of modern times.

During and since the days of Marshall Webb, the best operators and writers—including Webb—have almost unanimously advocated for the retention of gold contour fillings, especially in incisors, either cutting a step taking in one-half or two-thirds of what is left of the incisal edge of the tooth (see Figs. 1, 2 and 3), or cutting what is usually termed a doll-head or arm

on the palatal side, near to the cutting edge, extending quite two-thirds across the tooth, involving all of the enamel plate and nearly the entire thickness of dentin. (Figs. 4, 5 and 6.) Even the advocates of these procedures have admitted the weakened condition resulting from the cutting of the dovetail or doll-head on the one hand and the increased display of gold from the cutting of the step on the other.

Dr. C. N. Johnson, in a series of very ably written articles, running through volume xl of the *Cosmos,* presents on page 813 (figures "10" and "12") illustrations of a method which he advances for the retention of these large fillings. Of course by this method he prevents, for the time being, the extra display of gold which would be occasioned by the step-cutting (see Fig. 3), and anticipating the crumbling, removes entirely

FIG. 7.

FIG. 8.

the weakened lingual wall of enamel that is left in the cutting of a doll-head retainer. (See Fig. 5.) But it is very plain to even a casual observer that he has left a very weak, partially unsupported wall of enamel on the labio-incisal edge of the tooth.

In the "American Text-Book of Operative Dentistry," edited by Dr. E. C. Kirk, we find on page 192, in a strong article by Dr. S. H. Guilford on "Cavity Preparation," the illustration as seen in Fig. 4, where he extends an arm on the lingual surface, which he recommends to be cut but little deeper than the enamel. The weak support this method gives to the filling can readily be observed by the practical operator.

Dr. M. L. Hanaford, in an article before the Illinois State Dental Society on the "Preparation of Cavities," says, "The third

type of cases includes those cavities in which caries has progressed so far toward the incisive edge as to render unsafe any undercutting for retention at this point, but where, for esthetic reasons, it is desirable to retain the labial plate of enamel. In such a case the lingual plate is removed for a sufficient distance from the incisive edge root-wise, and extending into the body of the tooth far enough to make possible a step. This is deepened at the extremity, squared, and made retentive." (See Figs. 1 and 2.) This suggestion of Dr. Hanaford is clearly after the method of Dr. Johnson, as can readily be seen by comparing the two systems.

In this connection I would also refer to the idea advanced by Dr. Weld of New York, published in a leading text-book. This

FIG. 9.

method is illustrated in Fig. 3, compared with that advocated by Henry Sewell, M.R.C.S., L.D.S., of England. (See Fig. 7.) Dr. Sewell's method would have the advantage from an esthetic point of view, but would be at a disadvantage as to strength of retention.

In an article by Dr. Hanning, read before the Second District Dental Society of the State of New York, he advocates a kind of post retention for these display fillings. This idea, however, seems to be limited to those devitalized teeth where use can be made of the pulp-chamber and pulp-canals. (See right side of Fig. 8.)

I feel that it is hardly necessary to go farther into a review

of such methods, as I believe these few will suffice to establish the fact that they constitute the prevailing methods of retention of this class of fillings, if, indeed, there be anyone who would be prepared to deny it at all. I also believe that all will admit that in these methods there is necessarily a great sacrifice of sound tooth tissue, and in some instances a great display of filling from excessive cutting.

The only other means heretofore brought forward to improve these destructive methods—at least the only one which has come to my knowledge—is the little anchor screws illustrated in Fig.

FIG. 10.

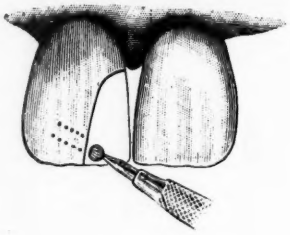


FIG. 11.

9. These screws have been used to a limited extent in very favorable cases, but they have never been popular on account of the clumsy size, and the difficulty in securing the accuracy necessary for their adjustment, as they depend on the holding power of the threads in the dentin for support. They also require a hole to be drilled, the size of which weakens the body of the tooth very materially.

As a general substitute for all these methods of preparation of cavities and retention of fillings, and especially those contour fill-

ings involving the restoration of the corners of incisors, I wish to offer the following idea, which, if not new, at least posseses some novelty, and which has not thus far, to my knowledge, been illustrated or published; it has in its favor the essential points of being extremely simple, strong, and practical: Instead of cutting away so much strong enamel and dentin in the formation of the steps for anchorage, it is only necessary to remove all weak walls, clear out the decay, and polish the margins of the enamel. Next make a slight groove, undercut, or any other shaping desired, at the approximo-gingival margin of the cavity, from which to be-

FIG. 12.

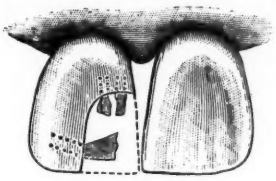
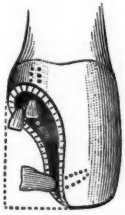


FIG. 13.



gin the filling. At the incisal edge take a very small round bur—about No. ½ of the "revelation" type, and bore a hole into the dentin between the two plates of enamel. Begin at the extreme incisal edge of the cavity, and proceed downward and backward approximately at an angle of about forty-five degrees, just missing the posterior horn of the pulp. (See Figs. 10 and 11.) Extend this hole deep enough, using judgment in each case, to give firm anchorage for the little iridio-platinum retainer which is to be cemented into it. (Figs. 12 and 13.) These little stays are pref-

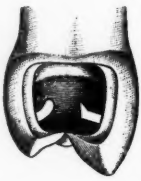
erably made of squared iridio-platinum wire, No. 20 gage or smaller, according to the size and thickness of the body of the tooth.

To give them an increased holding power, they are barbed on the edges, bent at an angle, and flattened at the end that is to be embedded into the body of the filling. Being thus flattened—which is quickly and neatly done by crushing with a pair of strong pliers—it will be readily observed by studying Fig. 13 that the bulk of the metal of the stay is all there for strength, and yet the flattening process has given it such shape that the strength of the gold has been but little impaired by having it thus flatwise embedded into it. The little wire stay can be easily adjusted, even in narrow spaces, by taking care to carry it to place with the flattened end projecting either labially or lingually, until it is pushed clear up into the previously drilled hole, and then turned downward until it assumes its correct position, as is seen in Fig. 12. These little wire retainers are exceedingly strong, and will stand

FIG. 14.

FIG. 15.

FIG. 16.



an enormous amount of force. By their use we sacrifice a minimum amount of valuable tooth tissue, reduce the display of gold to the smallest possible, and also get a much stronger anchorage for the filling. They are applicable to many other classes of cavities, as will be readily suggested to the practical mind. The simplicity of making and adjusting appeals at once to the progressive reasoner.

In Fig. 15 the application of the gold is shown, half built in, about the retaining wires seen in Fig. 14.

A suggested application is further shown in Fig. 16 which might extend the field of usefulness of these stays beyond that already demonstrated.—*Dental Cosmos.*

THE ANESTHETIZATION OF DENTAL PULP BY NERVE BLOCKING AND PERICEMENTAL INJECTION.

By Dr. Harold S. Vaughan, New York, N. Y. About five months ago, through the courtesy of my friend, Dr. F. L. Fossume, I had the opportunity of meeting Dr. Kjennerud, a dental chemist of Norway, who was in this country in the interest of a local anesthetic which he had discovered. He claimed that by the injection of one or two minims around a tooth, the pulp would be anesthetized and that the most sensitive cavity could therefore be excavated without pain.

Dr. Kjennerud introduced his remedy into Norway and Sweden about one year ago, certain dentists paying him large sums for the exclusive right. It was his intention to make similar arrangements in this country, after completing his European contracts. With that end in view, he most zealously guarded his secret and returned home without leaving a drop of his preparation behind. He consented, however, to give a demonstration on a patient secured by Dr. Fossume. The cavity was a mesial one in a right upper central incisor, and proved to be very sensitive; but after the injection of a small quantity through the gum on the palatal side the operation was rendered entirely painless.

Two or three days later, I secured a patient with an exposed pulp in the left upper second bicuspid. After Dr. Kjennerud had made an injection I was able to painlessly remove the pulp.

Dr. Fossume arranged for two other demonstrations, one of which was not so successful. The reason given by Dr. Kjennerud was that he had a new technique, suitable for certain cases, that could not be divulged at this time.

After discussing the matter with Dr. Fossume, I decided to carry on some experiments with the various local anesthetics, both alone and in combinations, in order to try and get a solution of greater anesthetic power than cocaine alone.

As a basic solution I used a normal saline ¾ of 1 per cent., to which was added enough adrenalin to make a 1 in 1-30,000 solution, a saline solution being less irritating to the tissues than plain water.

The adrenalin chlorid acts powerfully as a vaso-constrictor, increasing the duration of anesthesia. To this basic solution I added cocaine hydrochlorate, tropocaine and the following synthetic anes-

thetics: Stovaine, betaeucaine and acoine in combinations, injecting them in my arm in five minim doses and studying them as to duration and area of anesthesia, amount of irritation produced and after-effects. I will not attempt to give the result of all the injections, though I found that various combinations of the synthetic anesthetics and combinations with cocaine were no more potent than the single solution. I have tabulated the effects of the single solution:

In basis solution.	Duration.	Area.	Irritation.	After-effects.
Stovaine 1 p. c.	Anesthesia for 2 hours	2 cm.	Erythema lasting 3 days	Soreness on pressure for 3 days
Acoine 1 p. c.	Anesthesia for 2 hours	1.5 cm.	Marked erythema	Soreness on pressure with skin slough over site of injection 4 mm. in diameter
Eucaine B. 2 p. c.	Anesthesia for 2 hours	1.5 cm.	Hyperemia 3 days	Soreness on pressure 3 days
Tropocaine 1 p. c.	Anesthesia for 1 hour	1 cm.	Slight hyperemia 1 day	Soreness on pressure 1 day.
Cocaine 1 p. c.	Anesthesia for 2½ hours	2.5 cm.	Slight hyperemia 1 day	Soreness on pressure 1 day

As a result of these experiments I found:

1. Cocaine to be superior in anesthetic power.

2. Less irritating.

3. Milder after-effects than any of the synthetic remedies; while tropocaine, which is an associated alkaloid, is much less potent in anesthetic power.

I then made as my regular solution one containing cocaine, 1 per cent., phenol 1-400, and adrenalin chloride 1-30,000 in the normal saline solution.

The phenol increases the anesthetic power of the cocaine in addition to being antiseptic and preventing the development of fungi in the solution. This combination seemed to be the most satisfactory and is the one used in my experiments, though I have made some two, three, four, and five per cent. solutions.

We will next review briefly the anatomy of the pericementum and alveolar processes, together with the nerve supply of the teeth.

The alveolar processes are made up of two plates of compact bone, the external and internal; the space between these plates is

occupied by the alveoli or sockets of the teeth. The long partitions between the alveoli are less dense than the plates, making it possible to penetrate this spongy bone for a certain distance, with a sharp syringe needle. The alveolar process is covered by periosteum, which dips into the alveoli, forming the dental periosteum or pericementum which is firmly adherent to the wall of the alveolus and cementum of the tooth, thus holding the latter in place.

At a point just within the margins of the alveolus, the fibrous tissue passes horizontally between the root of the tooth and the alveolar wall, while toward the apex they pass obliquely, being attached to a point higher on the root than the alveolar wall, so that the tooth is swung in its socket. The fibres around the apex are spoken of as the alveolar-dental ligament.

The pericementum is a highly vascular tissue, deriving its blood supply from three sources:

1. From the vessels at the apical end of the root.
2. By vessels from the alveolar periosteum.
3. Through vessels of the Haversian canals in the alveolar walls.

The gums are made up of highly vascular dense fibrous tissue, firmly adherent to the periosteum beneath, and covered by mucous membrane.

The *nerve supply* of the teeth and gums is through the second and third divisions of the fifth. The superior maxillary nerve,while in the spheno-maxillary fossa, gives off the posterior dental branches which accompany the posterior dental artery. On the zygomatic surface of the maxilla small filaments pass to the gums and adjacent mucous membrane of the cheek and antrum while others pass through the posterior dental canals to the molar teeth. The middle dental branch is given off from the superior maxillary nerve on the posterior part of the infraorbital canal; it is directed downward and forward in the canal on the outer wall of the antrum to the bicuspid teeth. The anterior dental branch arises near the infraorbital foramen and passes down the canal in the anterior wall of the antrum to the incisor and cuspid teeth. These three nerves form anastomotic loops from which branches descend through the small bony canals to the apical pericementum, where they divide; some filaments enter the apical foramen to ramify in the pulp, forming a plexus beneath the odontoblastic layer; other branches ram-

ify through the pericementum, anastomosing with filaments from the gums and alveolar periosteum. The posterior part of the hard palate, with its overlying gum tissue, is supplied by the anterior palatine nerve from Meckel's ganglion which descends through the palato-maxillary canal, while anteriorly it is supplied by the naso-palatine which passes downward along the side of the vomer, through the anterior palatine canal and Scarpa's foramen.

The mandible is supplied by the inferior dental nerve which is a continuation of the posterior trunk of the inferior maxillary nerve. It passes beneath the lower border of the external pterygoid muscle to reach the interval, between the ramus of the jaw and the internal lateral ligament, where it enters the inferior dental canal which it traverses, sending branches to the teeth, gums and body of the bone. At the mental foramen, which is situated on a line with the root of the second bicuspid and midway between the superior and inferior borders of the jaw, the nerve divides into incisor and mental branches, the former supplying the incisor and cuspid teeth, while the latter emerges to supply the gums, chin and lower lip, communicating with the facial.

From the above review, we see that the dental pulp may be anesthetized in several ways:

1. By injection into the pericementum, the needle entering the gum near the neck of the tooth and then being directed against the root of the tooth to be anesthetized, the solution reaching the nerve as it enters the apical foramen.

2. By penetrating the outer or inner alveolar plate, opposite the apex, and then injecting.

3. By direct injection where the pulp is exposed, as in pressure anesthesia.

4. By injecting around a nerve at a proximal point and thus blocking the impulses; as, for instance, injecting around the inferior dental nerve at the mental foramen to anesthetize the teeth distal to this point.

The inferior dental foramen is situated at a point too far back to be reached in this manner. Deep injection at the tuberosity of the maxilla would probably reach the posterior dental nerves. The middle dental can not be reached readily as its groove lies on the inner surface of the outer wall of the antrum.

As the anterior dental nerve is given off from the infraorbital

canal near the foramen, it can be reached by injection into the infraorbital foramen. Such injection anesthetizes the superior incisor and cuspid teeth and, probably, the bicuspids through the anastomotic connections. Of course injection at this point anesthetizes the palpebral, nasal and labial branches, producing anesthesia of the upper lip, side of nose and lower eyelid.

The syringe should be all metal with strong finger rests, and a large end on the plunger to fit the hand. The needle must be rather small, of the best quality steel, with point well sunken into the shank.

The spongy bone between the sockets is less dense than the compact inner and outer plate; the needle should therefore be inserted near the base of the festoon that dips into the interproximal space, preferably on the labial and buccal side for the lower teeth, and the palatal for the upper. It is forced slowly in, at the same time injecting a little of the solution ahead, thus minimizing the pain of insertion. The point is then directed into the pericementum as high up on the root as possible; the spongy bone can usually be perforated thus, allowing the needle to reach the root at a point higher up. Several minims are then injected, using considerable force to drive the solution to the apex, thus anesthetizing the nerves as they enter the apical foramen.

The second method, that of penetrating the outer or inner alveolar plate, opposite the apex, and injecting the apical tissues, I have not had occasion to try as yet.

The third method, that of injecting directly into an exposed pulp, is useful in those cases where the pulp has been only partly anesthetized by the pericemental injection. It can then be easily completed in this manner.

At the present time I have used pericemental injection for pulp extirpation in thirty cases, and in that number have anesthetized molars, bicuspids, cuspids and incisors, as shown by the following list:

Lower third molars	2
Upper third molars	3
Lower second molars	2
Upper second molars	2
Lower first molars	3

Upper first molars	3
Lower second bicuspids	3
Upper second bicuspids	3
Lower first bicuspids	2
Upper first bicuspids	2
Lower canines	1
Upper canines	3
Lower lateral incisors	2

The fourth method, that of blocking the nerve impulse at a distance, I have carried out successfully at the mental foramen, the teeth being anesthetized as far as the median line on the side of injection and back to the second bicuspid. As yet I have not observed if the anesthesia extends beyond this tooth.

For the majority of cases, I find a 1 per cent solution strong enough; in others, a 2 per cent is better. I have used as high as 4 per cent and 5 per cent, but do not consider this necessary. When using the strong solution, or a large amount of the weaker ones, I usually give from 3 to 10 minims of Volasem.

Cocaine hydrochloratis	gr. x
Adrenalin chloridi	m. xv
Sodii chloridi	gr. viii
Phenol	m. iij
Aquae sterile qsad	dr i

The solution must be kept in amber colored bottles, away from the light.

Pulp extirpation is the most important one, as in cases of pulp exposure, where its removal is necessary. Instead of using arsenic trioxid, with its uncertainty as to the amount of pain it will cause and the length of time it will take, the pulp can be immediately anesthetized and removed, the root being filled at once if necessary. Of course the rubber dam should be applied and aseptic precautions observed, to avoid infection and a resulting pericementitis. Other indications often arise, such as the grinding of a vital tooth for crowning hypersensitive cavities, etc. Of course, this is not at all necessary in the vast majority of cavities as the pain of their preparation is scarcely more than that of the needle insertion necessary for the above.—*Items of Interest.*

GOLD INLAYS. By Chas. E. Woodbury, D.D.S., Council Bluffs, Iowa. After learning the technique of making gold inlays, the first question to decide is, where to use them. Where are they indicated and where contra-indicated? There can be no arbitrary rules laid down as to indications. With normally sound teeth, with normal membranes accessibility must be the guiding factor. In some mouths it would be impossible to make a good foil filling in the first molar; in others the distal surface of the second molar is easily accessible.

There is also a great difference in operators. A given cavity may be accessible to one operator and not to another. Unless you are sure you can make a good foil filling don't try it; make an inlay. A poor foil filling is the poorest thing anyone ever had in his mouth, but a good foil filling is the best dental operation. I am not one of those enthusiasts who assert that inlays will in time entirely displace the use of gold foil for filling teeth. I think a properly made gold foil filling will protect a tooth from recurrence of decay better than any other method we have in use today, and I never look to see its use abandoned. There are, however, many locations and conditions where I believe a gold inlay will give better service than a foil filling possibly could. They can be used in seventy-five per cent of those cases of extensive loss of tooth substance which are ordinarily treated by the use of crowns. Their use is indicated in very large cavities in the bicuspids and molars in which both the proximal and the occlusal surfaces have been lost, leaving poorly supported buccal and lingual walls alone standing. They are indicated in almost all mesio-occluso-distal cavities in the back teeth from which the pulp has been removed. They are indicated in the teeth of people who are very nervous and sensitive to the mallet blows. They are indicated in teeth with weak cavity walls, and in cavities that cannot be made readily accessible. They are indicated in cavities proximating bridgework over which rubber dam cannot be placed.

They are indicated very rarely in the upper front teeth except as anchors for bridgework. Large restorations of the lower front teeth, however, I think are better made with inlays using a post in the root canal for anchorage than with foil fillings. The very thin incisal portions of the lower incisors make it very

difficult to secure sufficient retentive form for large foil fillings. They are never indicated in shallow cavities. Judgment must be used in their application to the bicuspids and molars. I very rarely make an inlay in the upper bicuspids or first molars unless the cavity is of unusual size or the patient does not seem to be able to stand the malleting necessary for a foil filling.

They are not indicated in mesio-occluso-distal cavities in bicuspids which have vital pulps and good cavity walls on account of the very large cutting necessary and the liability of distorting the matrix when removing from the cavity. In the molars in mesio-occluso-distal cavities, unless there has been a very considerable loss of tooth structure, it is better to make two inlays, one a mesio-occlusal and the other a disto-occlusal rather than attempt to make it all one. The reason for this, of course, is to lessen the danger of distorting the matrix which is ever present in those very large cavities which have walls nearly approaching right angles and parallel lines.

There are many ways of making gold inlays. Of these I have at different times used seven or eight, but during the last two years have abandoned the use of all of them except the one I am now using and which I will describe to you.

The cavity preparation should follow that laid down for foil fillings as nearly as possible, using flat seats, walls only slightly divergent from parallel, occlusal anchorage and extension for prevention.

The cavity being prepared, a band matrix is fitted and wedged up in the interproximal space. The cavity is moistened and filled with guttapercha. When this is cool it is removed and is later used as a male die in swaging the matrix. A generous sized piece of 1-1000 platinum is pressed into the cavity with wet cotton, no account being taken of folds or tears unless the tears are at the margin; when this has been approximately pressed into place with the cotton, the guttapercha impression is forced into the cavity with considerable pressure, thus forcing matrix into close adaptation to the cavity walls. The matrix is removed and trimmed, leaving an overlap at the margins of about 1-16 of an inch. It is returned to the cavity and the wrinkles burnished out. A narrow piece of 1-1000 platinum is

folded T-shaped and soldered to the floor of the matrix with pure gold, leaving the stem of the T sticking out of the cavity. The platinum matrix is returned to the cavity, and a steel band matrix applied to the tooth. This serves to hold the platinum matrix in position and forms a box into which to pack the crystal gold. It is better to dry the cavity and anneal the gold, but it is not absolutely necessary. Any form of crystal gold may be used and enough is packed into the cavity to restore the contour, using large pluggers similar to the Royce. Large pieces of gold may be used and no effort to thoroughly condense should be made. The gold should, however, be packed well against the margins, thus forcing the matrix into close contact with the cavity walls and holding it there. The occlusal surface should be left a little scant. The band matrix is taken off while holding the inlay in the cavity and the margins are gone over and reburnished. The little platinum T is taken hold of with a pair of plyers and the inlay is lifted out of the cavity. The cavity surface is painted with whiting and alcohol and, using a blowpipe, enough twenty-two karat plate is melted on the crystal gold to thoroughly saturate it and restore the occlusal surface which was left a little scant in using the crystal gold. Very little borax should be used on the plate, as it will run well without it and it is liable to get on the back of the matrix and cause trouble. The inlay is then boiled in nitric acid to remove the whiting and the proximal surface and the gingival margin finished. The inlay is now set, using a good inlay cement, and is driven to place with a wood stick and mallet. The buccal, lingual and occlusal margins are well burnished. In about fifteen or twenty minutes, when the cement has set sufficiently, the occlusal surface is ground to occlusion and all the margins carefully finished and polished.

A summary might be given as follows: Where indicated:

First. In the upper front teeth as anchors for bridgework.

Second. In the lower front teeth in large proximo-incisal cavities.

Third. In the bicuspids and first molars, where both the proximal and the occlusal surfaces are gone and the pulp has

been taken out, or where the buccal and lingual walls are very weak.

Fourth. In all cavities in second and third molars except occlusal cavities.

Fifth. In cavities in teeth attacked by pyorrhea.

Sixth. In large cavities in teeth of children.

Seventh. In large cavities in the teeth of very nervous people.

Technique:

First. Prepare the cavity with square angles and walls only slightly divergent from parallel.

Second. Press platinum to place with wet cotton and then swage with guttapercha impression.

Third. Solder in platinum lifter with pure gold, trim the matrix and replace in cavity.

Fourth. Apply band matrix and restore contour with crystal gold.

Fifth. Coat cavity surface with whiting and saturate crystal gold with 22k. plate.

Sixth. Finish the proximal surface and gingival margin.

Seventh. Thoroughly clean and dry cavity and set with inlay cement.

Eight. Finish the same as you would a foil filling.—*Tri-State Record.*

THE REPAIR OF PORCELAIN FILLINGS. By Joseph Head, M.D., D.D.S., Philadelphia, Pa. Many conscientious porcelain workers declare that porcelain fillings should not be repaired. To patch them, they say, is a confession of failure—an admission that the operator was not able to carry out his original plan—and therefore the chipped filling should be replaced with a new one. This is the rather severe attitude of a stern idealist, who sticks to principle through everything, and as such, these opinions should receive sympathetic and respectful consideration. It is unquestionably true that a patched porcelain filling is not so perfect and beautiful a piece of work to examine critically as a perfect one. Such a filling, when viewed closely, is in no danger of passing unnoticed, and so is not *per se* so artistic. This admission, however, cannot be held as a

final condemnation of the practice of repairing porcelain restorations. On the contrary, the vast majority of chipped porcelain fillings can be so successfully repaired as to be still unnoticeable to the general observer.

So the proposition resolves itself into two questions: Are we to be exact copyists of nature in every detail—like, for instance, the great artist Meissonier? or are we to be impressionists, who only care to give the impression of perfect teeth to the outside general observer? We must remember that the impressionist may be equally true to an ideal when he feels that so long as our fillings look well from outside of the mouth, it is a question of indifference how they appear when examined by the mouth-mirror, if they are wholesomely preserving the teeth and performing their proper functions of mastication and interdental space protection.

It must also be remembered that we owe ideal justice to our patients, and we should not compel them to undergo the pain and expense of new fillings unless they are going to be reimbursed by receiving practical benefit. I would not be understood as decrying ideals; dentists cannot do good work without them; no work can be too artistic or too good; but let our ideals be practical. If an inlay cannot be inconspicuously patched so as to be sightly, strong, and tooth-saving, it should be replaced with a new one; but where a few minutes' work will make the filling as good if not better than before, it is ridiculous not to choose the lesser operation.

The one great objection to porcelain work lies in the fact that porcelain edges will chip when they are exposed to the direct force of the occluding teeth. There are but two ways of meeting this difficulty: One is to place the edge so as to avoid such occlusal shocks; the other is to boldly mend the edges when they crumble. The former cannot always be successfully done, but the mending can be accomplished in such a way as to make the fillings more likely to last than before the fracture occurred, which is not the case when an ordinary gold filling is repaired. For when decay sets in around a hammered gold filling, the microscopic spaces that usually occur between the metal and the tooth may lead the decay from the margin directly to the

bottom of the cavity. Thus in cutting out the spot of decay and filling it up with gold, there is no real security that caries may not have been left underneath. But with an inlay we know that the defective edge with its consequent decay does not extend below the hard cement. So having cut to that decay we can fill the defective line in perfect security that no infection has been overlooked. It has been proved conclusively that a one to two pound blow delivered on the edge of a porcelain filling by an occluding tooth will chip or powder the edge. There is a possibility of such an accident any time we eat. On the contrary, gold or amalgam flow before the force of percussion. If, therefore, we could combine the plasticity of these metals with the hardness and beauty of the porcelain we could have the almost ideal filling. And this is what we do, to a large degree, when we mend chipped porcelain with gold or amalgam; for with an edge so mended the force of mastication tends to hammer the gold into the edge and make it more perfect, rather than tending to cause a recurrence of the trouble.

The method of procedure is as follows: Cut out the defective line with a small inverted cone, cutting in the direction of the tooth rather than the porcelain. Dry the cavity with alcohol and hot air. Have moss fiber gold, properly annealed, in small pieces, near at hand. Mix some creamy cement, place it in the cut-out groove, and squeeze this cement out with suitable pieces of moss fiber gold, being careful to remove all excess of cement. When the cement has set, condense the gold and finish in the usual way with either hand or mallet. If amalgam be used the procedure is practically identical, only the cement is squeezed out with the amalgam instead of gold, and hardened by wafering in the conventional way. And let us note an advantage for this method that has not perhaps been given its just due: When a gold or porcelain filling is cemented into place the entire cement line is just as large as the largest grain of cement powder in the mix. But with gold or amalgam flowing around the few large grains, the cement line becomes almost imperceptible.

The places most likely to need mending, as before stated, are those that receive the direct force of mastication, such as the

grinding surfaces of molars and bicuspids. The fillings on the labial aspect of incisors, canines and bicuspids are not subject to such stress and therefore are not likely to need mending. But with these in a certain percentage of cases a black line will appear. This, from the very fineness of the cement line, is most difficult to remedy, but it may usually be accomplished in the following way: Put on the rubber dam. Wash the dark line with alcohol and afterward with ammonia; dry with a hot air blast. Then flow 25 per cent pyrozone into the darkened fissures and dry instantly with as hot an air-blast as the patient can bear. This will usually render a part of the line white and clean, when the pyrozone can be reapplied and the procedure repeated until the stain has been entirely removed. The line can then be refilled with cement and the filling will be as good as new.

When porcelain corners of incisors chip on the cutting edge between the tooth-structure and the filling, leaving a little three-cornered nick, in the vast majority of cases a new filling will give the most satisfaction. But even these nicks can sometimes be cut out from the back and filled as previously described, so that the small amount of gold that shows in front will be invisible from a distance of ten inches. This, from the impressionistic point of view, is all that is necessary; for, as a very bright young lady once said, speaking of the fine gold line, if anyone gets nearer than ten inches, even then he is not likely to see it.—*Dental Cosmos.*

REPAIRING FRACTURED CROWN AND BRIDGE FACINGS: NEW METHOD. By W. Francis Mellersh, London, England. There being nothing new under the sun, the following method about to be described may have occurred to other operators. I believe, however, it is original, inasmuch as I have not discovered any previous description of a similar one.

This process was tried by me five years ago to meet the exigencies of a difficult case where the facing had become detached from a first pre-molar crown. Since then it has been adopted in a number of cases with increasing satisfaction. A troublesome operation has been thereby rendered one of the easiest, special

crown and bridge repair outfits and various patented and detachable facings being quite unnecessary.

Fig. 1 shows a small bridge with the facing broken away. After clearing away any fragments of porcelain remaining around the pins, the latter are covered with guttapercha or oxyphosphate of zinc and trimmed so that an impression in foil can be easily withdrawn.

The procedure is the same as in producing a matrix for an

FIG. 1.

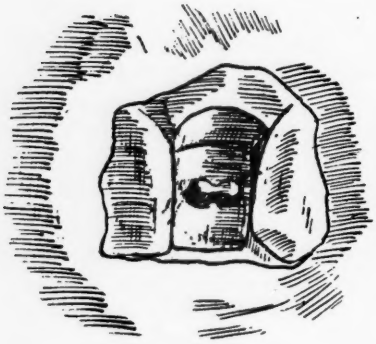


FIG. 2.

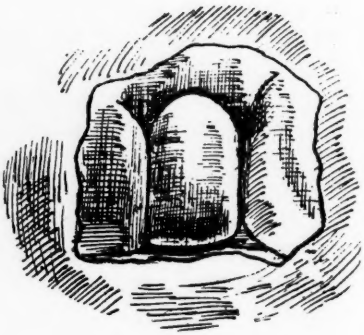


FIG. 3.

inlay. Gold or platinum foil is swaged over the backing, the lateral surfaces of the adjoining teeth, and the adjacent gum, with wool or spunk. This foil impression is then removed on the end of a pencil of wax.

Invested in alcohol and asbestos and the wax removed, the matrix appears as in Figure 2.

A new facing is built up with body in the furnace, and appears as Figure 3. With the various porcelains now at our disposal there should be no difficulty in matching any tooth. After this had been allowed to cool gradually to insure perfect annealing, the foil is stripped and the glaze removed from the back of the new facing, Figure 4, with hydro fluoric acid. Any overlap can be trimmed from the edges with a square-edged stone, and under-

FIG. 4.

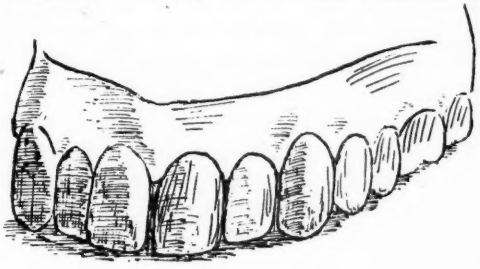


FIG. 5.

cuts made with a very small diamond disk to insure a good hold for the cement around the pins. After roughening the surface of the metal backing with a fine graver, fixation is accomplished by means of any cement suitable for inlay work. The whole is now varnished, and the facing held in place by wax cement flowed on to the sides of the adjoining teeth.

Means will readily occur to the operator whereby this method is applicable in cases where one or both pins are broken away from the backing.

Either high or low fusing body can be used, and if preferred, the impression can be taken in dental lac and a matrix obtained by means of Ash's water-bag swager.

The result, Figure 5, is an extremely neat and strong repair—ten minutes will suffice to make the matrix, and five minutes to cement the facing, the rest of the work being done in the laboratory.—*Items of Interest.*

THE BLUE LIGHT AND HEAT AS THERAPEUTIC AGENTS. By A. W. Harlan, M.D., D.D.S., New York, N. Y. For several years hints as to the usefulness of the blue light have

appeared in our journals and the daily papers, without much thought as to its utility as a therapeutic agent. Many years ago, from the experiments of General Alfred Pleasanton, Mr. Gladstone, Prof. John W. Draper, Schellen, Pancoast, and others, some things were learned with reference to the action of the blue light on vegetation and fruit-growing, but not much was obtained relative to its action in inducing relaxation of the nervous system as a whole. It was found that in all cases of "excessively accelerated tension," much relief was experienced when the blue ray was used.

It remained for Professor Redard to demonstrate by this means a sort of anesthesia which would enable the operator to extract a tooth or two after an exposure of the eyes to a blue ray through an electric lamp. This was done by using a sixteen-candle lamp, with a bright metal reflector, held at about four inches from the open eyes of the patient. The head and the lamp were covered with some dark blue cloth, and the room was darkened for about two or three minutes, when the anesthesia was sufficient to prevent pain in the extraction of two or more teeth.

After reading Professor Redard's article a little more than two years ago, I had a blue lamp installed; for some reason, however, it did not act perfectly well, so I used a reflector composed of a series of mirrors, which gave me much better results.

After a time I came to the conclusion that I could improve upon this, so I had a lamp case constructed of tin, lined with a thin sheet of asbestos, and the outside and inside painted and varnished a dark blue. After the lamp was adjusted, I had a blue glass slide so that the light would pass through the lamp and the slide, making it more effective. It now works very well, and I hope that it will enable many of you to perform small operations on the teeth and gums painlessly, without using drugs. In all cases of pain in the jaws an exposure of from two to three minutes will arrest it for several hours. This is true also when it is applied to bruises and sprains, or lacerations. I have extracted several teeth, one at a time, with this improved lamp, and have removed deposits from the roots of teeth that were very sensitive before the exposure.

It may be that the series of mirrors will be an addition to the efficiency of this lamp, but I am not yet prepared to say that it is a necessity to obtain the best results.

The Blue Light and Heat on the Gums.—For more than two

years I have used a small blue light on the gums for two purposes: The first is to cause a relaxation of the nervous tension; and the second, for the purpose of applying heat in connection with the blue light, so as to effect a double object—to prevent the development of organisms and to stimulate the tissues to a return to health. If the deposits are removed from the root of a tooth, and if they are carefully washed out of the pocket and around the gingival margin, this small blue lamp may be held within one-half to one-quarter of an inch from the gum for from two to three minutes, when the operation is suspended until the next day.

After six daily exposures, I allow the patient to rest for a week, when upon a close examination, if the deposits are found to have been removed, I repeat the exposure for another six days and the case will be practically cured. Great care must be used not to burn the gum tissue. If it be found that all discharges of pus from the pocket have not been arrested by these exposures, I give another period of rest to the patient and repeat the exposure. During the treatments no medicines are used at all, but I thoroughly massage the gums, and the patient brushes the teeth, using a simple powder. There is no objection to the use of any of the non-irritating washes during the treatment.

The ancients were in the habit of using various colored lights in the treatment of diseases, but their systems fell into disrepute because they enveloped them with so much secrecy that only charlatans and impostors applied them. It was not until Finsen and Roentgen placed before the world their discoveries that a renewed interest was displayed in the utilization of various rays in the treatment of disease, as well as the diagnosis of obscure lesions.

These few observations are presented to you with the hope that operations around the roots of teeth and treatment of diseases of the gums may be much simplified, and that the dread of the chair may not deter so many persons from obtaining satisfactory dental service.—*Dental Cosmos.*

CAST LOWER DENTURES. By Frank L. Dayment, D.D.S. We are to talk on the subject of cast lower dentures, Watt's fusible alloy or weighted plates. It has been my practice for some time, where the patient has little or no alveolar process or

ridge, and would, consequently, experience difficulty in retaining the denture, to make a plate of this kind. I speak now of the lower only.

Let us run over the construction of such a piece of work. The first procedure is the same as for any denture, viz., a good plaster impression. This I consider very important in any case, and is in my mind superior to modeling compound or any other material, where the case will permit its use.

I expect some of you will differ with me at this point, for I know there are men who claim that modeling compound is superior to plaster of Paris; but experience is a great teacher, and one should use that material which in his hands gives the best result, and while modeling compound is favored for many prosthetic purposes, experience has convinced me that it cannot be used to advantage where great accuracy in reproduction is necessary.

After securing the impression, it is given a thin coat of shellac varnish, then a thin coat of sandarac varnish to fill up the pores so that we may have a smooth impression. After the varnish is dry, soak the impression in water and pour model without oiling the impression, using a mixture of three parts plaster of Paris and one of finely ground asbestos or pumice.

Now, in order to obtain the bite carefully, fit your trial or base plate to the model by means of heat. I use Dr. Graft's base plate material—it is quite strong and will not bend with the heat of the mouth—on top of which is mounted a roll of wax, and the patient is allowed to bite into the wax, thus securing the proper relation of the jaws. The case is now ready to mount on the articulator in the usual way and for the teeth to be set up. If the case will permit, I generally use gum section teeth in order to obtain the porcelain gum. Of course plain teeth can be used, but in such case it will be necessary to vulcanize a rubber facing, as it would not do to show the metal.

Some prefer to make a base only of the metal, and attach the teeth with rubber or celluloid, but of course the plate would not be so heavy, and in this case we want weight.

If gum teeth are used, do not grind the joints very closely or have feather edges, for the contraction of the metal might

check the porcelain. Great care should be taken in waxing up the case, for it is much easier to trim wax than metal, and if careful you will have little trimming to do in the end.

Now the case is ready to try in the mouth, and, just here, let me say, I think the majority of us do not take time enough in this particular, but are apt to guess just a little and trust to luck as to the articulation, fulness and length of the teeth, etc. But what a disappointment when the plate is finished and put into the mouth to find that had we been more careful at the "trying-in stage," we would have had a more pleasing result to both patient and operator.

The next step is flasking. The flask used for this work is a special one, with a gate or hole at each heel. The investment should be the same as the model, viz., three parts plaster and one of asbestos or pumice. After hardening, heat flask carefully, not enough to melt the wax, but soften only. Open flask and remove wax. Now cut a groove from the heels of the model through the heels of the flask and bolt together; place the case in an oven until perfectly dry and, in fact, quite hot, so that when the metal is poured the teeth will not crack.

Now melt the ingot of metal, which is an alloy of tin, silver, bismuth and gold, and pour into one of the openings of the flask until the metal appears in the opposite opening. Do not jar or handle the flask until it is cool, and use the melting ladle for nothing else. Some place the flask in molding sand to prevent the metal from escaping between the two parts of the flask, but I have not found this necessary.

Now that the case is cool, place it in water for a short time and remove the plate, and trim in the usual way. I do not claim that the weight of this plate will keep it in place, but is an aid only; the rest remains for the patient to master and the education of the mouth muscles.

To repair, cut away enough metal to let the new teeth go into place, touch the margins with chlorid of zinc, invest as for a new piece, and pour; or repair with rubber or amalgam.

This plate when made entirely of metal is in many ways superior to rubber, being more cleanly and stronger, withstands the chemical action of the mouth; it is also cool, and I find does not irritate the mouth.—*Dental Practice.*

The Dental Digest.

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At 2231 Prairie Avenue, Chicago,

Where All Communications Should be Addressed.

Editorial.

THE IMPORTANCE OF DENTAL GATHERINGS.

The season for annual meetings of different dental societies is now at its height. There are several important meetings yet for this season. The first is the Pennsylvania State Dental Society, which meets at Pittsburg early in July. This from present indications bids fair to be one of the most important meetings of the season, having a good literary program as well as clinics. Another prominent gathering will be the International Dental Congress to be held at Jamestown, Virginia, in connecting with the Jamestown Exposition, but we are not in possession of enough of the facts to discuss its prospects and will take this up in another issue, when the necessary information is in our hands. The meetings which we wish to discuss more at length are to be held at Minneapolis during the last days of July and the first of August. These meetings are the annual gatherings of the National Association of Dental Examiners, National Association of Dental Faculties and the National Dental Association. During the meeting of the latter association the American dental manufacturers will hold another of their expositions.

The meeting of the National Association of Dental Examiners is always important. Their counsels and the rules that they have adopted and the measures for improvement growing out of these annual meetings are of inestimable value. The standard of qualifications for practice has been improved, a closer bond of union among the many State Examining Boards has been established, and, eventually, we may expect to see a uniform standard of qualification, with rules adopted governing these different boards, so that a license from one will be interchangeable

in any State of the Union. Until this is accomplished a great work of the Examiner's Association is unfinished.

With the work of the National Association of Dental Faculties we are not at this time very familiar; its gatherings, however, have always been fraught with interest, and improvements suggested and introduced which have been beneficial to the individual colleges.

As for the National Dental Association, this organization, which was originally under the auspices of the American Dental Association, is one to which we have given much interest in the years gone by. Having been intimately connected with its workings for thirty odd years and having missed but two meetings in that time, we still have great faith in what will be accomplished eventually. By this we wish it to be understood that, in our opinion, the National Association has not, so far, nearly accomplished the amount of good it might and should have; nevertheless, it must ultimately become the greatest factor in the advancement of dentistry in these United States, and all that pertains thereto.

We have discussed this question editorially and otherwise at different times with the view of ascertaining, if possible, the cause for the apathy of the dental profession toward our national organization. The membership and the numbers in attendance at the annual gatherings, as also the work accomplished, are all entirely inadequate to the needs and requirements of a National Dental Association. If we are correctly informed the section work is to be eliminated this year, comparatively speaking, and the entire literary program discussed and dealt with in full meeting of the entire body. If this change of plan is true it is an acknowledgment that section work has not been a success. This plan of conducting the meetings of our National Dental Association was patterned after the American Medical Association, but until we have an attendance many times larger than that of any previous meeting it is probable that the literary work of the Association will be more satisfactorily carried on before the full attending body. The literary program, as announced we would say, is somewhat meager, even for the National in its present form.

The announcement is made that the main part of the pro-

ceedings will be in the form of clinics and here, again, we repeat the comment and criticism made on several former occasions. A meeting of the National Dental Association is not a suitable place for clinics, for the numbers who can witness a clinic are so out of proportion to the number of clinics given that much of the time is wasted. This year, however, conditions differ somewhat from those of former meetings, for which reason we incline to the belief that the making of clinics such a prominent feature is wise. This is attributable to the fact of the Dental Manufacturers' Exhibit being held at the same time and in connection with the National in so far as the clinics are concerned, arrangements having been made for the clinics of both Associations being held in one hall.

When it is understood that the manufacturers represented will give upwards of one hundred different demonstrations and clinics by way of illustrating the uses of the latest appliances and materials required by the dentist, it will be realized what a school this will be for every practitioner of dentistry who can attend. In fact, it will constitute a short post-graduate course, so to speak, and the invitation is extended to every practitioner, whether he belongs to a dental society or not. He can come and see these clinics and witness the demonstrations, which will be given by men skilled in the different lines, as this is a part of the program of the manufacturers' meetings. While these displays of manufacturers' products are made in part for the benefit of the dental trade in general they are primarily intended as an educational force and to afford a means for the profession viewing a line of dental supplies which is practically complete. Meetings similar to this have been held, along with the clinical demonstrations, from time to time, but it is expected that this will be the most interesting display that has ever been given in this line.

Notices.

DETROIT DENTAL SOCIETY.

At the annual meeting of the Detroit Dental Society, held at Detroit, May 9, 1907, the following officers were elected: President, F. W. MacDonald; Vice-President, G. F. Burke; Secretary, D. M. Graham; Treasurer, J. M. Thompson.

KANKAKEE COUNTY (ILL.) DENTAL SOCIETY.

The Dental Society of Kankakee County, held at Kankakee, April 23, 1907, elected the following officers for the ensuing year: President, A. J. Harper; Gardner; Vice-President, J. G. Wilman, Peotone; Secretary, Dr. Huff; Treasurer, Dr. Winters.

NATCHEZ AND ADAMS COUNTY (MISS.) DENTAL ASSOCIATION.

The Natchez and Adams County Dental Association was organized at Natchez, April 24, 1907. Dr. T. C. West was elected president and Dr. G. Stewart Hardy, secretary.

JO DAVIESS COUNTY (ILL.) DENTAL SOCIETY.

At a meeting of the Jo Daviess County Dental Society, held at Galena, April 27, 1907, the following officers were elected: President, R. Rogers, Scales Mound; Vice-President, T. G. Wonderly, Galena; Secretary and Treasurer, H. H. Howard, Galena.

LAWRENCE (MASS.) DENTAL CLUB.

At the fifth annual meeting of the Lawrence Dental Club, held May 8, 1907, the following officers were elected for the ensuing year: President, M. A. Dignan; Vice-President, Robert Farquhar; Secretary, Arthur T. MacKay; Treasurer, Charles A. Frank.

WALWORTH COUNTY (WIS.) DENTAL ASSOCIATION.

At the annual convention of the Walworth County Dental Association, held at Elkhorn, Wis., early in May, 1907, the following officers were elected: President, B. C. Campbell, Lake Geneva; Vice-President, E. V. Cooley, Sharon; Secretary, T. H. Fahr, Elkhorn; Treasurer, Alice Sherman Barber, Lake Geneva.

WATERBURY (CONN.) DENTAL SOCIETY.

At the meeting of the Waterbury Dental Society of Waterbury, Conn., held May 7, 1907, the following officers were elected: President, F. C. Marggraff; Vice-President, J. J. McDonald; Secretary, H. W. Stevens; Treasurer, W. B. Brewster. Executive Committee, W. O. Beecher, W. E. Neff and F. E. McLaughlin.

GEORGIA STATE DENTAL ASSOCIATION.

The thirty-ninth annual meeting of the Georgia State Dental Association was held at Atlanta, May 7-10, 1907. The following officers were elected: President, T. C. Gibson, Forsyth; 1st Vice-President, C. P. Davis, Americus; 2d Vice-President, W. C. Miller, Augusta; Corresponding Secretary, D. H. McNeill, Athens; Recording Secretary, Delos Hill, Atlanta; Treasurer, H. R. Jewett, Atlanta. Executive Committee, Joe Broughton, Atlanta;

E. A. Tigner, Milledgeville; R. Holmes Mason, Macon; W. E. Bugg, Athens. Next place of meeting will be at White Sulphur Springs.

IOWA STATE DENTAL ASSOCIATION.

The forty-fifth annual meeting of the Iowa State Dental Association was held at Cedar Rapids, May 7-9, 1907. The following officers were elected: President, C. E. Woodbury, Council Bluffs; Secretary, T. F. Cook, Burlington; Treasurer, G. W. Slingluff, Burlington. Des Moines was selected as the next place of meeting.

EASTERN INDIANA DENTAL ASSOCIATION.

The annual meeting of the Eastern Indiana Dental Association, held at Anderson, closed its meeting May 15, 1907, with the election of the following officers: President, Leonard Strange, Marion; Vice-President, Charles Kniese, Cambridge City; Secretary and Treasurer, Edward H. Hulley, Marion. Next place of meeting will be at Marion.

VERMONT DENTAL SOCIETY.

At the annual meeting of the Vermont Dental Society, held at Burlington, May 17, 1907, the following officers were elected: President, C. H. Kent, Barre; 1st Vice-President, Harry F. Hamilton, Newport; 2d Vice-President, Charles F. Meecham, Bellows Falls; Secretary, Thomas Mound, Rutland; Secretary-Treasurer, W. H. Munsell, Wells River.

NEW YORK STATE DENTAL SOCIETY.

The thirty-ninth annual meeting of the New York State Dental Society was held at Albany, May 10-11, 1907. The following officers were elected: President, W. S. Rose, Schenectady; Vice-President, Louis Meisburger, Buffalo; Secretary, Ellison Hillyer, Brooklyn; Treasurer, W. D. Jewell, Richfield Springs; Correspondent, S. L. Goldsmith, New York.

SOUTHERN CALIFORNIA DENTAL ASSOCIATION.

The tenth annual convention of the Southern California Dental Association was held at Los Angeles, May 8-10, 1907. The following officers were elected: President, J. F. Cooke, Los Angeles; 1st Vice-President, Leland D. Jones, San Diego; 2d Vice-President, W. L. Warnekross, Santa Barbara; Secretary, Charles M. Benbrook, Los Angeles; Editor, Kate D. Buck.

VANDERBILT DENTAL ALUMNI ASSOCIATION.

At a meeting of the Vanderbilt Dental Alumni Association, held at Nashville, Tenn., May 11, 1907, the following officers were elected: President, J. A. Dale, Nashville; 1st Vice-President, W. G. Whitsett, Lebanon; 2d Vice-President, C. W. Kranz, Huntsville; Recording Secretary, W. T. Hutchinson, Nashville; Corresponding Secretary, J. A. Perkins, Nashville;

Treasurer, G. G. Workman, Nashville. Executive Committee, W. H. White, Winchester; S. K. Davidson, Union City.

ILLINOIS STATE DENTAL SOCIETY.

The Illinois State Dental Society held its forty-third annual meeting at Quincy, May 14-17, 1907. The following officers were elected: President, W. A. Johnston, Peoria; Vice-President, Henry L. Whipple, Quincy; Secretary, Arthur D. Black, Chicago; Treasurer, C. P. Pruyn, Chicago; Librarian, J. T. Cummins, Metropolis. The next meeting will be held at Springfield.

SOUTHEASTERN DISTRICT MASSACHUSETTS DENTAL SOCIETY.

The annual meeting of the Southeastern District Massachusetts Dental Society was held at Taunton, May 1, 1907, and the following officers were elected: Secretary, F. O. Kidd, Fall River; Treasurer, Elton S. Jewett, Plymouth. Executive Committee, Drs. Stanley, Mann and Peters of New Bedford; Councillor, Dr. Eagan, Fall River.

ALABAMA DENTAL ASSOCIATION.

At the thirty-eighth annual convention of the Alabama Dental Association, held at Birmingham, May 14-17, 1907, the following officers were elected for the ensuing year: President, A. T. Reeves, Selma; 1st Vice-President, G. W. Randell, Blocton; 2d Vice-President, Lorenzo F. Luckie, Birmingham; Secretary, E. W. Patten, Selma; Treasurer, W. J. Reynolds. Executive Committee, J. E. Frazier, Birmingham, and George Vann, Gadsden.

OREGON STATE DENTAL ASSOCIATION.

The fifteenth annual session of the Oregon State Dental Association was held at Portland, May 4, 1907, and the following officers were elected for the ensuing year: President, A. L. Beatie, Oregon City; Vice-President, W. R. Allen, Independence; Secretary-Treasurer, M. C. Holrook, Portland. Executive Committee, M. C. Harris, Eugene; W. C. Shearer, Portland, and J. M. Yates, Portland. Next meeting will be held at Portland.

NORTH DAKOTA DENTAL ASSOCIATION.

The annual convention of the North Dakota Dental Association was held at Fargo, May 14 and 15, 1907. The following officers were elected: President, H. L. Starling, Fargo; Vice-President, T. G. Thompson, Cavalier; Secretary, O. H. Sossaman, Lisbon; Treasurer, Samuel Rowan, Hillsboro. Executive Committee, Drs. Brownlee, Devils Lake; Ticknor, Lakota and Ralston of Larimore. Devils Lake was selected as the next place of meeting.

News Summary.

A. B. E. AUSTIN, a dentist of Galion, Ohio, died April 20, 1907.

J. T. HARPER, 77 years old, a dentist of Ingram, Pa., died May 6, 1907.

J. W. L. RABE, 72 years old, a dentist of Monongahela Valley, Pa., died May 8, 1907.

HORATIO W. CLAPP, 82 years old, a dentist of Westfield, Mass., died April 24, 1907.

J. BOND LITTIG, a well-known dentist of New York city, died suddenly May 24, 1907.

W. H. HIPPLE, 66 years old, for 40 years a dentist of Pittsburg, Pa., died May 4, 1907.

JOHN P. KENNEDY, 83 years old, a retired dentist, died at New Dorp, N. Y., May 7, 1907.

WM. B. HENDEL, 60 years old, for 33 years a dentist of Muskegon, Mich., died recently.

JAMES CRANKSHAW, 81 years old, a retired dentist of Frankford, Pa., died May 10, 1907.

CHARLES COULTER, 77 years old, a retired dentist of Petrolea, Ont., died April 19, 1907.

J. W. CAMERON, a well-known dentist of Salina, Kan., died from heart disease April 20, 1907.

R. W. SMITH, 38 years old, a dentist of Rio Visto, Cal., was accidentally drowned, May 1, 1907.

LOFTUS H. GOODRICH, 64 years old, a retired dentist of Springfield, Mass., died from heart disease, May 2, 1907.

L. W. FRENCH, 70 years old, one of the oldest dentists of Los Angeles, Cal., died from apoplexy, April 24, 1907.

GEORGE A. COLLINS, a young dentist of Cincinnati, Ohio, died suddenly in a Pullman car at Montgomery, Ala., May 6, 1907.

NAPOLEON DUFRESNE, commonly known as Dr. Napoleon Ashley, an itinerary dentist, died suddenly at Lowell, Mass., May 14, 1907.

RICHARD CALDWELL BREWSTER, for more than thirty-five years a well-known dentist of Brooklyn, N. Y., died in that city May 18, 1907.

DENTIST COMMITS SUICIDE.—Dr. B. B. Stoddard, a dentist of Boston, Mass., committed suicide April 24, by taking poison. He was 46 years old.

SHOOTS HIMSELF.—Dr. O. C. Hiatt, a dentist, shot himself in the chest, at Veronia, Ore. Physicians think he will recover.

WILLIAM NEWTON TULLER, 24 years old, a son of Dr. R. B. Tuller of Chicago., Ill., and a graduate of the Chicago College of Dental Surgery, died at Carlsbad, N. M., of typhoid fever, May 1, 1907.

DECAYED TOOTH CAUSES DEATH.—Death from spinal meningitis, due to a decayed tooth, was the conclusion arrived at by a coterie of prominent

physicians following an autopsy held over the body of Nina Jackson, a negress, who died at the Memphis city hospital recently.

KILLED HERSELF RATHER THAN HAVE TOOTH PULLED.—Suffering excruciating pain from a decayed tooth, Mrs. Arnold Karrer applied to a Sioux City, Ia., dentist for relief. When told the tooth would have to be pulled she declared she preferred death. Returning home she drank three ounces of carbolic acid and died in thirty minutes.

RETIRED.—G. P. Wiskell, for more than tweny-five years a prominent dentist of Boston, Mass., has retired from the practice of dentistry.

NEURALGIA.—For facial neuralgia a small quantity of oil of sweet birch rubbed over the nerve gives great relief.—*Dental Era.*

HEREDITY.—"Do you believe in heredity?" asked the lawyer. "Sure," replied the dentist. "My father used to pull stumps when he worked on a farm."

DIVORCE.—Decree was granted Dr. Gustavus S. Junkerman, Dean of the Cincinnati College of Dental Surgery, May 10, divorcing him from his wife, Pearl Hall Junkerman.

IMMENSE FEE FOR ILLINOIS MAN.—Mark Smith, formerly a dentist of Mount Carmel, Ill., but now living in Calcutta, was paid the sum of $10,000 for filling ten teeth for the Ameer of Afghanistan.

PRESENTED WITH A LOVING CUP.—Dr. M. C. Marshall, dean of the St. Louis Dental College, was presented with a loving cup by members of the Alumni Association at the annual banquet of the association, May 8.

AGREED.—"Determination and faith will stop even a toothache," said the mental science expert. "I'm sure they will," answered the materialist, "if a man has determination enough to hunt up a dentist in whom he has faith."

TAKING IMPRESSIONS.—A few drops of liquid sanitol in the water with which plaster is mixed for taking impressions gives a pleasant taste and renders this disagreeable operation less unpleasant.—W. R. ROHBACH, *Dental Brief.*

FIRES.—The office of Dr. D. C. Barnhill of Corning, Ark., was destroyed by fire on May 1.—Dr. Harry Tweedy of Lebanon, Kan., suffered a partial loss of office equipment on May 14.—Dr. H. M. Yaple, Mendon, Mich., lost recently by fire which started from vulcanizer.

AMERICAN DENTIST IN HAREM.—Dr. Frank Bostwick of Coshocton, Ohio, now located at Gibraltar, has become dentist to the Sultan of Morocco. The work upon the royal molars will probably consume a long time, as Bostwick is allowed to work upon them only one hour each day.

PYORRHEA TREATMENT.—I wish to call your attention to a syringe that I have found useful in the treatment of cases of pyorrhea alveolaris. About four years ago Dr. Eames suggested for the placing of treatments in pyorrhea pockets a syringe in which he used a vaseline mixture, with the idea that the effect would be more lasting. Later Dr. Wheeler talked about acetezone for this purpose. I found this very effective, but I disliked his means of get-

ting it into place. I therefore was led to adopt Dr. Eames' idea so far as the syringe is concerned, mixing the acetezone with vaseline at the time of use. After mixing it must be used within fifteen or twenty minutes.—H. W. GILLET, *Journal.*

CUT FALSE TEETH FROM STOMACH.—A remarkable operation was performed on Grant Miller, a farmer, who lives near Johnstown, Pa., at the Setton Hospital, Cincinnati. An abdominal incision was made and three teeth, which had been accidentally swallowed, were removed.

REVENGE.—E. A. Hessler, a dentist of Pittsburg, confessed recently to having set fire to the dental offices of J. I. De Roy, also of Pittsburg. Hessler acknowledged having done so because he was angry with Dr. De Roy, who had sent him to the workhouse for 30 days on a charge of forgery.

NOTHING TO RETRACT.—"Oo! ouch! That hurts! I thought you were a painless dentist!" "So I am, madam. I'm the only painless dentist in the office. All I do is to make the artificial teeth. The man that does the extracting hasn't come in yet, but you insisted on having it done right away."

ILLEGAL PRACTITIONERS—Four dentists of Pittsburg, Pa., were held for court May 18, charged with practicing dentistry without having qualified before the State Board of Examiners. The defendents are being held in $300 bail.—A dentist of Salt Lake City was recently convicted of practicing dentistry without a state certificate. The court fined him $60. He will appeal.

REPAIRING AN AMALGAM FILLING.—To repair an amalgam filling, dry it thoroughly, freshen the surface and using a little soft amalgam at first, build it as you wish, being careful to see that the occlusion does not displace it before it sets. If you doubt this, just freshen the surfaces of two old fillings and after allowing to set, try and break the joint.—W. A. ROBERTSON, *Dental Review.*

REMOVING RICHMOND OR PORCELAIN CROWNS.—Use a rubber and corundum wheel that is thin and grind from center of cutting edge down to the root. Then take a large, strong hoe excavator of the obtuse variety and force the porcelain and backing in two. Peel off the band and cap, run a crosswise bur around the pin and the operation is then easily completed.—C. B. PLATTENBURG, *Dental Review.*

HYGIENIC CONDITIONS AS AN AID TO PERMANENCY IN DENTAL OPERATIONS.—Permanency in dental work largely depends on absolute hygienic conditions, and this cannot be accomplished unless rigidly enforced. The accumulation of food particles on the lingual surfaces of posterior bridges, without the wearer's knowledge, tends to pathological development subsequently, and many unfavorable reports from patrons follow. To avoid this I advocate a mouth wash as follows: Alcohol, 100 parts; salol, 5 parts; menthol, 1 part. Directions, 15 to 20 drops in a glassful of tepid water, to be used with some good tooth powder and brush after each meal. Patrons should be instructed and the dentist should have an explicit under-

standing with them and insist on compliance with rules of oral prophylaxis. A little time and inclination on the part of the dentist will soon produce the everlasting friendship of his patron and thus constitute part of his success in practice.—*Dental Review.*

STANNO-PERCHA.—Equal parts, by weight, of gutta-percha and sifted sponge tin are put in a mortar, the mortar placed in a sand bath and the ingredients thoroughly kneaded until a grayish violet mass is obtained. One-half is to be used soft for cavity lining. The other half is again kneaded with an equal amount of sponge tin, to be used for the body of the filling.—DR. ARTHUR SCHEUER, *Era.*

DEFECTIVE ENAMEL.—I have found beneficial results in cases of deficient enamel in children's teeth by filling the irregular cavities, or surfaces, with some sticky cement. In time this can be ground down somewhat, and the gentle irritation of the dental fibrils will cause a protetctive growth which increases the resisting power of the dentine against decay.—R. R. ANDREWS, *Dental Register.*

PETROGEN.—Of late I have seemed to find benefit in directing patients, and I now do it in all cases, to rub on one of the combinations of iodin and oil, like Wyeth's "petrogen" into the gum, above the tooth, two or three times on the day following the filling of a root canal. These combinations do not stain and do not blister and are said to stimulate the phagocytes to increased endeavor to destroy the morbific bacteria.—C. P. BRIGGS, *Journal.*

EXTRACTING DECIDUOUS TEETH.—Sometimes the pulp of a deciduous tooth dies before there is any absorption of the root and often these roots are not turned down as rapidly as those containing live pulps. Therefore, if a deciduous tooth is a mechanical obstruction, or if it causes the permanent tooth to go outside or inside the line so as to make an irregularity, it is very much better to take that tooth out and allow the permanent tooth to erupt in its proper place.—A. W. HARLAN, *Dental Review.*

SPRINGFIELD, MASS., TO HAVE A DENTAL LIBRARY.—A proposition made by the library authorities of the city library at Springfield, Mass., to establish a dental department in connection with the medical library has been accepted by the dentists of that city, and a committee of three, Drs. H. Everton Hosley, William F. Andrews and C. Wesley Hale, has been appointed to raise funds. A nucleus for such a library was provided in the legacy of $500 from the late Dr. J. Searle Hurlbut, the income of which is to be used to buy dental works.

NARCOTILE.—I have administered narcotile some two hundred times with almost invariable success, and by success I mean that the anesthesia was perfect—that is, profound enough in 90 per cent of the cases. A few of the remaining 10 per cent woke up before I was through with them. There was no serious disadvantage in that, however, because the patients are in a state of analgesia for quite a time before regaining complete consciousness, during which time I can operate with very little pain, as they afterward admit. I often have trouble with children in making them take the inhala-

tion. Children are always afraid of the inhaler, and the usual mild coaxing is of no avail. I have adopted the plan lately, with highly satisfactory results, of spraying a piece of cotton with the anesthetic and applying same to the nose. The analgesia produced is very gratifying.—W. H. REABEN, M'Comb, Miss., *Dental Review.*

WOMAN DENTIST SINGLE, HAS BETTER PULL THAN AS WIFE.—Wm. F. Dutton, a prominent lawyer, mining man and broker of Lead, S. D., and Miss Jennie Hines, an attractive young dentist, were married a year and a half ago at Omaha. The reason for the silence was that Mrs. Dutton was very successful in her profession and thought that if the fact of her marriage was known her business would fall off, and it was only when Mr. Dutton moved to Denver that it was decided to make the matter public.

SENSITIVE DENTIN.—Some time ago Dr. Fossume spoke of the use of "formalin" for controlling the sensitive spots at the necks of the teeth that are sometimes so troublesome. At that time I questioned its safety, but since trying the method I have found it so satisfactory that I wish to speak of it at this time. The "formalin" should be used full strength and it must be kept away from the gum. A very short application is sufficient to control entirely a very large proportion of these cases.—H. W. GILLETT, *Journal.*

REMOVING BROKEN PIVOTS FROM ROOT CANALS.—I have read a number of suggestions regarding the removal of broken pins of Logan crowns from root canals, but am not aware that the present method has been previously published. I take a rose-head bur, follow the pin and cut it out instead of the hard tissues around it. Platinum pins are soft, and I find no difficulty in cutting them out. I have never had any difficulty whatever in drilling a pin out, regardless of its length or of the nature of the root canal.—B. B. DETWILER, *Cosmos.*

OBJECTION TO ADRENALIN CHLORID.—The well-known liability of secondary hemorrhage after the use of adrenalin renders it unsatisfactory as a menstruum for cocain in pressure anesthesia. I recently used it in removing the pulp from a central incisor and packed the canal with cotton saturated with an anesthetic. At the next sitting I found the entire crown of a decidedly pinkish hue, showing a thorough infiltration of the tooth substance with hemoglobin. The vigorous use of pyrozone practically restored the tooth to its natural color, though not entirely so.—A. J. COTTRELL, *Brief.*

IDENTIFICATION BY PALATE.—Dr. Paul Prager, an Austrian army surgeon who has made a special study of methods of identification, recommends that prisoners should be identified by the shape of their palates. He thinks the system far more efficacious than by finger prints.

Dr. Prager declares that the method would be much more reliable than any at present used, for among the thousands of moulds he has taken of the interior of the human mouth he has failed to find two which even slightly resembled each other.

He says that though the teeth alter greatly with time, the markings of the palate remain unchanged throughout life. The individuality of the

palate is greater and more permanent than that of any other part of the body, and a detective force which possessed a large collection of mouth moulds would have a guide infinitely safer than a gallery of finger prints.—*Brit. Dental Journal.*

FALSE TOOTH MAKES WOMAN SPEECHLESS.—Rendered speechless and suffering intense pain, Mrs. A. M. Holtz, whose husband struck her in the mouth, knocking a false tooth down her windpipe, lies in a critical condition at the Omaha General Hospital. The surgeons are powerless to help her, because they cannot locate the missing tooth. Unless relief comes speedily the attending physicians fear she is doomed.

THE FUNCTION OF THE DENTIST.—Next, Dr. Osler pointed out the threefold relationship existing between the dental practitioner and his patients. The function of the dentists was first to relieve suffering; second, to *increase the digestive capacity of his patients,* and, thirdly, to preserve the beauty of the human countenance. Of these Dr. Osler regards the *increase of the capacity to digest food* as the most important. This end is to be attained by promoting mastication until the food is divided as finely as possible before it enters the stomach.—C. M. WRIGHT, *Dentists' Magazine.*

DENTIST LOSES CASE.—John B. Thompson, a dentist of Denver, Colo., secured judgment against the Fidelity and Casuality Company of New York for $1,000 for injuries received by being struck in the eye by some tiny particles of septic matter while operating on a patient. The decision has been reversed in the upper court, owing to a recent decision of the United States Court of Appeals, which holds that a wound, within the meaning of an accident insurance policy covering blood poisoning, must be an abrasion of the skin or membrane whereby germs are introduced into the blood.

ROBBERIES.—Drs. Ingalls & Scott, Boulder, Colo., May 20; $300 worth of gold and platinum.—George R. Warner, Grand Junction, Colo., May 20; gold bridges valued at $150.—Drs. Thorp & Darby, St. Joseph, Mo., April 30, about $75 worth of gold.—Drs. Willett & Trerise, Helena, Mont., April 30, more than $75 worth of gold.—Drs. Noel & King, Nashville, Tenn., May 20, instruments and old gold fillings.—May 8 the dentists of Palestine, Tex., were robbed of all the gold in stock used for crowning teeth, and were also heavy losers in finished work. The losers are J. H. Grant, Smith & Barnes and Dr. Davis.

DAMAGE SUIT.—J. E. Richardson of Horse Cave, Ky., who sought to collect $5,000 as damages from the Wyatt Dental Company, of Louisville, for a broken jaw bone, was denied damages by a jury in that city recently. He alleged he applied to the defendants for the removal of a tooth last August and in the effort of the operator to extract it the right lower jaw was fractured and an abscess resulted. It was contended by the defense that the jaw was not broken, but that all the trouble arose from the abscess, which was said to have been at the base of the tooth prior to the time the tooth was extracted.

THE TEETH IN TYPHOID FEVER.—At a meeting of the Clinical Society of Manchester on February 19 a paper was read by Dr. A. Knyvett Gordon, medical superintendent of Monsall Hospital, on the "Treatment of Enteric Fever." He pointed out that while he had nothing new to say on this subject, he wished to emphasize the importance of certain measures which deserve attention in private practice. Among these he advocated a thorough cleansing of the mouth in all cases, with removal of carious teeth when present, pointing out that the so-called characteristic dry and brown tongue was more often due to oral sepsis than to typhoid alone.—*Brit. Jour. Dental Science.*

IODIN AS A GERMICIDE.—In a solution of iodin varying from two-tenths to one per cent we have a very potent germicidal agent, far superior to mercury bichlorid—the acknowledged leader of all other antiseptics. It approaches nearly to the ideal antiseptic in that (a) it is easily prepared and is stable; (b) is non-toxic and non-irritating, in the strength effective, being only one-fourth as toxic as mercury bichlorid; (c) it does not coagulate albumin or form inert compounds with tissues; (d) it is effective in a very brief time; (e) the stain it produces soon disappears; (f) last and most important, it possesses a remarkable penetrating power. A five-tenths per cent solution is amply strong for all practical purposes.—*St. Louis Medical Review.*

IMPORTANCE OF CUSPS.—I would like to call attention to the importance of building up cusps and forming sulci when filling a first permanent molar, or any other tooth. When these first large teeth erupt they are groping around for a place to occlude, and as the glenoid fossa at this age is very imperfectly developed and the eminentia articularis is not formed there is great play of the lower jaw, and it is the final locking of the cusps of these first permanent teeth that holds the mesio-distal relation of the jaws and also the length of the bite. They continue to hold it, too, until the second permanent molars erupt to assist them, for the incisors and bicuspids are not of much assistance. This shows the necessity of properly building up these cusps.—DR. BOLTEN, *Pacific Dental Gazette.*

MARRIAGES.—George E. Bell, a dentists of Fergus Falls, Minn., was married to Miss Edith Mortensen of the same place, May 15.—A. L. Brillhart, a dentist of Tecumseh, Neb., was married to Miss Evelyn Dale of Centerville, Ia., May 21.—Murat T. Fordyce, a dentist of Tuscaloosa, Ala., was married to Miss Maymie E. Porter of Louisville, Ky., April 1.—M. E. Gale, a dentist of Oakes, N. D., was married to Mrs. Myrtle Vinkle of the same place, early in May.—E. W. Johnson, a dentist of Sarcoxie, Mo., was married to Miss Jessie Bales of Carthage, May 6.—Burt Mangold, a dentist of Ft. Wayne, Ind., was married to Miss Nora Andrews of Monroe, May 9.—B. E. C. Slawson, a dentist of Salem, Mo., was married to Miss Carrie G. Daniels of St. Louis, April 20.—Wm. Smith, a dentist of Richmond, Ind., was married to Miss Lottie Reed of Grand Ridge, Ill., May 1.—L. R. McCarty, a dentist of St. Louis, Mo., was married to Miss Velma Wirwick of the same place, May 29.—J. E. Forsyth of Sydney, Australia, a recent

graduate of the Northwestern University Dental School, was married to Miss Claudia Baird of Chicago, during May.—Jerome W. Egbert, a dentist of Chicago, Ill., who was recently divorced from his wife, Marion Thornton Egbert, was married to Miss Matilda Cannon, also of Chicago, May 25.

INVESTING CROWNS AND BRIDGES.—Indifference and slovenly methods used in investing crowns and bridges produce too frequently unsatisfactorily fitting bridges and result in broken and checked facings. The habit of pushing a case into a soft, moving mass of investment, which in turn rests on an uneven or soft surface, such as blotting paper, or even common paper, is bad practice. Proper size boxes, from the ordinary sandpaper disk boxes to well-selected ones of larger sizes, should be used. The boxes filled about two-thirds with investment material will firmly hold and securely encase every line and crevice of the invested bridge or crown. Save your sandpaper disk boxes; they are useful when investing a single crown or small bridges.—A. PERCIVAL BURKHART, *Items of Interest.*

SUGGESTIVE ANESTHESIA.—The use of hypnotism in the dental profession was given a successful test, April 20th, in the Dental Department of the Medico-Chirurgical College of Philadelphia. The test consisted in pulling a tooth that had an abscess at the root and had been broken off at the crown. No pain whatever was felt and the only consciousness the patient had of anything going on was that he felt the tooth slipping from his jaw. The one to introduce this science into the college was William E. Hoffman, a junior student in the department. Hypnotism as a means of making dentistry painless has been tried by several institutions and dentists with more or less success, and, it is claimed, has been experimented with in the Medico-Chirurgical Hospital for the past two years.

EXPANSION OF PLASTER OF PARIS CASTS AND ITS COMPENSATION BY THE CONTRACTION OF ZINC DIES.—The expansion of plaster can be readily perceived by anyone who is called upon to employ this material in the laboratory. I will give you a little of my personal experience. Out of seven plaster impressions taken of five different mouths, dies made of low-fusing metal resulted in five misfits. Of five plaster impressions of the same five mouths—taken as most of us take these plaster impressions—zinc dies made from those plaster casts resulted in five fits; that is to say, the patients could wear the plates constructed upon these dies. We all know that zinc shrinks considerably, and the shrinkage of the zinc just about compensated for the expansion of the plaster.—*Dental Register.*

TROUBLESOME THIRD MOLARS.—The most frequent cause of the serious complications attending the eruption of third molars is lack of vertical space for the proper development of the organ; nor is this restriction always directly due to the disproportion between the size of the teeth and the dimensions of the maxillary. On the contrary, the irritation is usually produced by the contact of the previously erupted third molar with the distended membrane covering the erupting tooth in the opposite jaw. In most cases where trouble exists a careful investigation will disclose a distinctly

visible imprint upon the inflamed gum, which receives its impact at all times when the mouth is unopened. A careful grinding of these cusps generally suffices to reduce the inflammation, relieve the pain and restore the parts to a healthy condition.—W. KELSEY, *Dental Record.*

TO REMOVE A MORBID GROWTH OF GUM TISSUE FROM A CAVITY.—Frequently we have cases when a morbid growth of gum tissue fills, or partly fills, a cavity. Its removal is not only somewhat painful, but it is also a mean piece of work to cut it away on account of the excessive hemorrhage. In the majority of such cases it can be removed neatly and with dispatch, painlessly and bloodlessly, by ligating with a piece of silk to either the tooth with the cavity or the adjoining one, whichever is the more convenient. This cuts off the blood supply and reduces to a minimum the pain when cutting away the growth with a side motion of a small flat burnisher or other suitable instrument. If a bad case, touch with trichloracetic acid. For those who have not tried this method of removing this troublesome growth the result will be surprising.—*Dental Office and Laboratory.*

FLIES AND TUBERCULOSIS.—Dr. Frederick T. Lord of Boston reports in the *Clinical Contributions* of the Massachusetts General Hospital for February a series of experiments to demonstrate the role of flies in the dessemination of tuberculosis. His conclusions are (1) that flies may feed on tubercular sputum and excrete living bacilli which remain virulent for two weeks or longer; (2) that human beings are in danger from eating food defiled by fly specks. If these fly specks are mechanically disturbed they may infect the air with tubercle bacilli.

He suggests that all tubercular material should be carefully protected from flies, that rooms and hospital wards containing tubercular patients should be well screened during fly season, and that all foodstuffs should be well protected from flies to guard against possible infection.—*Dietetic and Hygienic Gazette.*

BROACHES AND THEIR CARE.—Select two wide-mouth bottles with interchangeable ground glass stoppers, one of which should have a flat top and a hollow inside. Into such hollow stopper fit a cork. Fit the cork tightly using a vulcanite file to trim the diametrical excess. Open two or more packages of broaches, lift out each broach carefully and push each into place into the cork. Have the barbed ends reach to as nearly as possible the same horizontal plane. Then pour in enough carbolic acid to just cover the barbs nicely and label the bottle. Into the second bottle pour a quantity of absolute alcohol. When broaches are needed take out the stopper with broaches from the carbolic acid bottle and exchange with the stopper from the alcohol bottle. Shake a minute or so to neutralize the action of carbolic acid, and the broaches can be used with the assurance that there is nothing on them that is apt to give trouble. The advantage of a flat top to glass stopper is obvious—you can set it down on the bracket table and it will not roll about. Replace empty punctures in the cork with new broaches and again immerse the whole in acid for future use. When the acid discolors, showing signs of deterioration from exposure to light and age, change it for

fresh, and, besides, keep it in the dark corner of your medicine cabinet. This is all, and it is just as simple as it sounds. But there is one thing certain, it is neat, effective and is not a costly method.—*Dental Brief.*

CLASS INCIDENCE OF CANCER.—Mr. David Heron, M. A., Galton Research Fellow in National Eugenics, has been doing further work on this subject. In a memoir on the relationship of fertility in man to social status, recently noticed in the *British Medical Journal* (December 15, 1906), he has dealt briefly with the relation of cancer incidence to social status. He has shown that cancer is the one exception out of the qualities dealt with which is associated with a higher social status. The correlations obtained indicate that the cancer rate is highest among both men and women where (1) the birth rate is lowest; (2) where the proportion of professional men in the population is highest, and (3) where most domestic servants are kept. In other words, cancer appears to be correlated with higher social status. It is perfectly true that these results are only found for the London districts, but it must be remembered that it is in London alone that we are able to trace the cancer deaths to their distinct origin, owing to the "corrections for institutions" provided by the medical officer for the county of London.—*Brit. Jour. Dental Science.*

EPISCOPAL SURGERY.—At a recent meeting of the Hotel of St. Luke, held in the Church House, Westminster, the Bishop of Selkirk gave some interesting details of his early experiences in remote regions where skilled medical assistance is not to be had. His experience in the Arctic regions, hundreds of miles away from doctors and nurses, made him appreciate such an institution for the clergy as the hostel. People had come to him to have fingers taken off and teeth pulled out. One lady came 1,500 miles to have a tooth taken out, a fact that emphasized in a remarkable way the horrors of toothache. He practiced on his wife, and she practiced on him, a method of acquiring clinical experience that is somewhat too limited for the ordinary medical student. Once when he lived among the Esquimaux in a snow house he became suddenly ill with pleurisy; so he mixed mustard and snow with splendid effect and made himself well again. His predecessor as bishop amputated a man's leg with a common saw and a butcher's knife. Much of the practice of surgery is clearly within the grasp of a man of resolution and manual dexterity, but the same observation applies much less to the more difficult methods of the physician.—*Brit. Jour. Dental Science.*

FEES FOR BROKEN APPOINTMENTS.—The *Dominion Dental Journal* says that recently "Dr. O. A. Marshall of Belleville undertook to collect a fee in the courts from a patient who broke an appointment. He required a twenty-four hour notice of inability to keep an appointment, but in this case the patient gave only one hour's notice. He had more than one patient that morning that he could not work for because he had the appointment in question. The judge, in commenting on the case, said that if it was the habit of dentists to charge for broken appointments he was going to do what he could to stamp it out. He could not see how Dr. Marshall

lost anything, inasmuch as the patient afterward made another appointment and had the work done. If she had gone to someone else, then he could understand the reason for the action. Is not this the comment of a man whose own time is worth little or nothing and thinks everyone else is like himself? It seemed too much for him to understand that an hour lost can never be regained. A dentist's time is his living. He cannot make up time, because every patient comes at an appointed hour and will demand the time. There are many cases on record where judges have said that broken appointments must be paid for. This is the first one coming under my notice where it was held that the fee could not be collected."

NON-CORROSIVE STERILIZER FOR DENTAL INSTRUMENTS.—Requirements: In form, liquid; in action, rapid, certain, penetrating, bland, volatile, cleanly, uncontaminating, non-toxic, non-irritant, antiseptic, germicidal, portable, inexpensive, analgesic, easily prepared, convenient to apply to each instrument, each time used, and non-corroding.

℞ Specific echafolta (Lloyds) ..... ℥ jss
Alcohol deodorized ..... ℥ ss
Glycerin Pur. ..... gtts.x
Ol. Rose Geranium ..... gtt. ij
Mur. cocaine (coarse crystals) ..... grs. xxxviij
Acid carbolic (crystals) ..... grs. xx
M. Sig. as directed.

PROCURE a glass bonbon dish three inches in diameter by one and one-half inches in height; sides oval; in use pour off compound from well corked bottle enough to cover a bur-head, drill, excavator or searcher point, and before or after using, either dip in the compound each time either is used and at night before laying away. Forceps points wet with the lotion will become instantly sterilized. Two or three drams of the compound will last a month if evaporation is met by the addition of alcohol and the dish is kept covered when not in use. A piece of thick rubber-dam makes a good cover. The dish and two ounces of the compound need not cost more than $1. I have used the preparation for years and know its efficiency. Its value is beyond price.—A. C. HEWETT, *Dental Review.*

A METHOD OF CLEANSING AND PERFUMING RUBBER DAM.—The following is a method for perfuming rubber dam, and will at the same time render it practically aseptic: Thoroughly wash the rubber with soap and hot water. Then wash in a 1 in 40 phenol solution. Rinse in hot water. To subsequently perfume the rubber: Take about a pint of boiling water and add about 2 ounces finely powdered French chalk. Allow this to cool. Dissolve a sufficient quantity of the essential oil or mixture of essential oils, with which it is intended to perfume the rubber, in about 1 ounce of rectified spirit. Add this to the chalk and water. Shake this mixture, pour it into a clean basin and soak the rubber in it for about ten minutes, working the rubber about so that its entire surface gets washed over. Then remove and hang up to dry. Bottle the mixture for future use. The rubber dries streaked with French chalk, but by rubbting it in the hands all streaks are

readily removed and sufficient chalk is left on the surface of the rubber to prevent its sticking together. Roll up or cut into pieces ready for use and box. The result is a clean rubber with a pleasant perfume. I have found it much appreciated by patients.

The following essential oils, among others, are useful: Rose, lavender, orange blossom (Neroli), rose geranium, Java cananga.

If one prefer to have the rubber dam an odor of some antiseptic, the desired antiseptic can either be added to or entirely substituted for the essential oil in making the above mixture. Treated in this manner, the rubber not only takes up the perfume but retains it.—*Quarterly Circular.*

EXAMINING BOARD AFFAIRS.—The Georgia Board has concluded the examination of 75 applicants to practice dentistry. C. T. Brockett, Atlanta; S. P. Barfield, Macon; W. H. Weaver, La Grange, and John H. Coyle, Thomasville, were elected on that board at the May meeting.—May 18 G. F. Ambrose of El Dorado was appointed a member of the Kansas Board to succeed M. I. Hults of Hutchinson.—At the May meeting of the Mississippi Board 39 out of 45 applicants were successful in passing the examination. President Clement of this board states the number of dental applicants has shown no increase in recent years. J. H. Phillips, Meridian, has been appointed to fill a vacancy caused by the death of P. P. Walker of Brandon.—The first meeting of the new Territorial Board of New Mexico was held May 13. Following is a list of the members: C. N. Lord, Santa Fe; L. E. Ervin, Albuquerque; F. E. Olney, Las Vegas; F. N. Brown, Roswell; M. J. Moran, Deming. Dr. Olney was selected as temporary president and Dr. Lord as secretary pro tem.—May 16 the Tennessee Board held the first examination under the amended law regulating the practice of dentistry in Tennessee. Under the former laws any person could apply for a license and was entitled to an examination. Recently the law has been so amended as to provide that only those holding certificates of graduation from some reputable dental school were eligible for examination for state license.—At a meeting of the North Dakota Dental Association, held at Fargo in May, 1807, the association took exception to the appointment of F. W. Chandler of Valley City as a member of the State Examining Board. A protest was addressed to the Governor, and the association also declined unanimously to admit Dr. Chandler or Dr. Gale, also of Valley City, to membership, the specific grounds for refusal being that they were non-ethical.

ON THE SEPARATION OF PLATINUM, GOLD AND SILVER FROM A MIXTURE OF LABORATORY FILINGS.—The method about to be described of separating platinum, gold and silver from laboratory filings is the one followed by a well-known Parisian firm of assayers. The quantities of the different chemical reagents and substances given throughout this review are the quantities to be employed in treating a weight of filings of about 100 gm.

Dissolution. Place in a glass globe of one-liter capacity the quantity of filings to be treated and a mixture of 150 gm. nitric acid C. P. and 450 gm. hydrochloric acid. Heat the globe over a dull fire or in a sand bath.

Evaporation. When the filings have been dissolved, pour out the contents of the glass globe into a porcelain dish and evaporate the fluid slowly to a syrupy consistence. Now add to the syrupy fluid 100 gm. of hydrochloric acid, and cover the dish with a funnel to prevent any portion of the liquid from splashing out on account of the active reaction which takes place upon the addition of the hydrochloric acid. When the reaction is completed, evaporate the solution as in the previous case to expel the excess of acid.

Separation of silver. Add to the liquid 300 gm. of distilled water, and heat for about one hour in order to complete the precipitation of silver chlorid. Filter and collect the filtrate in a glass of 750 ccm. capacity. The precipitate of silver chlorid which remains in the filter is washed three or four times with boiling water, and this water is added to the filtered solution.

Separation of platinum. To the filtered solution 150 gm. of pulverized ammonium chlorid are added, and the contents of the glass are stirred with a glass rod and allowed to decant for at least six hours. The platinum will now be found precipitated in the form of chloro-platinate of ammonia. The platinum precipitate is now collected by filtering and is washed with 200 gm. of cold water, to which 30 gm. of sal ammoniac have been added. The platinum precipitate and water are again filtered and the liquid is collected in a glass receptacle of one-liter capacity.

Separation of gold. In the latter receptacle 100 gm. of crystals of ferrous sulfate are dissolved, stirring the mixture from time to time with a glass rod and allowing it to decant for eight to ten hours. The gold is slowly precipitated in the form of a brownish powder. The contents of the glass receptacle are now filtered in order to collect the brown powder, which should be thoroughly washed, as in the case of the silver chlorid.

The separation of the precious metals being now completed, it remains to convert the products thus obtained into metallic form.

After having been completely dried the silver chlorid is placed, together with the filter in which it is held, in a crucible, where it is fused with a mixture composed of three times its weight of sodium carbonate and 4 per cent of its weight of charcoal. After the mass has been fused and cooled the crucible is broken and the silver ingot is removed. The chloro-platinate of ammonia is detached from the filter and the paper is burned in a porcelain dish in order to collect the small particles of platinate that may have remained attached to the paper. Into the same porcelain dish the platinate is placed and calcined, heating the dish slowly and progressively and carrying it eventually to a white heat, at which point it should remain until the evolution of white fumes has ceased. The gold is treated by the same process as described in the case of silver, with the exception that instead of the sodium carbonate and charcoal mixture it is fused with three times its weight of borax and once its weight of saltpeter.—L. LEMERLE, L'ODONTOLOGIE, *Dental Cosmos.*